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Section of Neurology and Psychiatry.

President: H. M. Birch, C.B.E., F.R.A.C.P., D.P.M., M.R.C.S., L.R.C.P., South Australia.

Vice-Presidents: J. Bostock, M.R.C.S., L.R.C.P., M.B., B.S., D.P.M., F.R.A.C.P., Queensland; D. W. H. Arnott, M.B., Ch.M., D.P., F.R.A.C.P., New South Wales; A. J. M. Sinclair, M.D., B.S., M.R.C.P., F.R.A.C.P., Victoria.

Honorary Secretary: J. Game, M.D., B.S., Victoria.

Problems in Epilepsy and its Management.

A SYMPOSIUM was held on the subject of epilepsy.

E. GRAEME ROBERTSON (Victoria), discussing present-day concepts about epilepsy, said that Hughlings Jackson's statement that he considered epilepsy to be due to a sudden temporary disorderly discharge of neurons of the cerebral cortex might be taken as marking the beginning of the modern era of knowledge of epilepsy. He showed that epilepsy could be caused by "coarse" cerebral lesions. Clinical observation of spreading motor attacks, and subsequent pathological correlation, suggested to him the position and arrangement of the nerve cells which caused voluntary movement. Thus one man added more knowledge of epilepsy, and of the mode of action of the cerebral

cortex, than all preceding generations. Little more was added until Berger in 1928 demonstrated that fluctuations of electrical potential were produced by the cerebral cortex. Since then the electroencephalogram had become a potent instrument of research and investigation. Different types of epilepsy were accompanied by characteristic dysrhythmias during attacks. A definite diagnosis of epilepsy, or its exclusion, was possible only if an attack occurred during the recording. Certain forms of dysrhythmia were commonly found between seizures, but few of them were diagnostic of epilepsy. In order to increase the diagnostic range of the instrument, a number of procedures were used to provoke larval epileptic discharges (activation). The simplest was over-breathing; the most complex, but

the most effective, was combined "Metrazol" and light stimulation. One of the most important recent suggestions was that *petit mal*, characterized as it was by the sudden outburst of slow waves and spike activity symmetrically over each cerebral hemisphere, was due to disorder of centrally placed "pacemaker" neurons. Stimulation of the intralaminar portion of the thalamus had been shown to modify cortical rhythm and to produce electrical discharges similar to those of *petit mal*.

L. B. COX (Victoria) read a paper on the structural basis of epilepsy. He referred first to the problem of the extent to which significant pathological changes could be investigated be found in the brains of those who had suffered from epilepsy, and said that the answer was not convincingly given in the literature, and the incidence varied greatly with the source of the material. No precise answer was possible with reasonable methods of investigation. However, a minimum percentage could be determined in a group of patients who had had epileptic attacks, and that had been done in a series of 223 private patients, children and adults, examined by one observer during life. The selection had been alphabetical, and every patient who had had an epileptic attack had been included. Dr. Cox said that that series was the basis of the paper he was presenting, and the usual methods of examination had been used. His results could be summarized in the following way. An organic focus had been found in 82 (36%); but in addition there were 48 cases in which the disease was suspected but not proven, chiefly because of insufficient examination. From comparison with a control series, it seemed that at least one subject in two would have shown organic changes, which would have made a minimum percentage of 47 for the entire group. Undoubtedly that figure would be too low; it could be expected in any unselected group of epileptics of all ages that an organic basis would be found in at least one in two. The value of a full investigation of all epileptics was surely unquestionable. Of the structural causes found, trauma proved the commonest; vascular disease came second and cerebral vascular tumour third. Syphilis played a minor role. Dr. Cox said in conclusion that it had to be realized that the methods used in his study for proof of structural changes were coarse and incomplete. If the human brain in all its complexity could be unfolded for full examination, without doubt the percentage of structural changes found would be greatly increased.

JOHN F. WILLIAMS (Victoria), speaking on "Queer Turns—the Lesser Known Manifestations of Epilepsy", said that the classical form of epilepsy was in itself very queer, and that very little was known regarding its causation. There was considerable variation in the susceptibility to convulsions, and some apparently major attacks were precipitated by sensory stimuli—for example, sound, light or touch. Sometimes, but not always, a severe emotional upset was brought about by such stimuli. The presence of an emotional setting for an attack did not mean that it was necessarily hysterical. Some emphasis was placed on the strangeness of some of the aura, as well as on the post-convulsive phenomena. Caution was thought necessary in regarding peculiar behaviour, particularly in children, as being epileptic even in the presence of abnormal electroencephalograms, unless there was evidence of other epileptic seizures. Dr. Williams mentioned the distinction between classical *petit mal* and minor motor seizures and discussed such rarer types as akinetic seizure and tonic seizure as well as the "periventricular epilepsy" of Kinnier Wilson. He also referred to difficulties of diagnosis between such seizures and attacks occurring in narcolepsy, as well as in anxiety states and hysteria.

GEORGE SELBY (New South Wales) discussed the drug treatment of epileptic attacks. He said that progress in neurophysiology and electroencephalography had provided a rational basis for the drug treatment of epilepsy, and many new effective anticonvulsants had been introduced in recent years. At present, at least ten useful anti-epileptics were available in Australia, and three more had satisfied

clinical trials overseas. The basic chemical structure of most of them was similar, but the mechanism of their action was not fully understood. Sedative anti-convulsants probably protected the unstable epileptic brain from the abnormal discharge, while the hydantoins and related drugs inhibited the epileptic process directly.

Dr. Selby went on to say that successful therapy depended on careful study of each individual patient, on the choice of the drug specific for the type of seizure, and on the timing of its administration according to the incidence of fits. Thus, female epileptics with predominantly premenstrual seizures required increased dosage and water restriction during those critical days. *Grand mal* responded most often to a combination of "Dilantin" and "Prominal". If that was inadequate, or if toxic manifestations appeared, "Mesantoin", phenobarbitone or bromides should be tried until the most effective combination was found. "Mysoline", not yet available in Australia, promised to be of help in some resistant cases, and "Phenurone", though toxic and requiring the utmost care in administration, might help when all else failed.

Over 75% of *petit mal* patients responded to "Tridione", to "Paralidone" or to "Malidone". They should all be tried, but constant supervision was essential, as toxic granulopenia occurred occasionally. Psychomotor seizures were the most difficult to control. Some responded to "Dilantin" and "Mesantoin", while "Phenurone" was reported to be the most effective. *Status epilepticus*, a medical emergency, was best treated by the intravenous administration of paraldehyde. With the intelligent and conscientious use of the drugs mentioned it was possible to abolish or significantly reduce the number of fits suffered by the vast majority of epileptics.

GUY SPRINGTHORPE (Victoria) discussed the management of the epileptic. He said that in the treatment of any chronic illness, psychological and social aspects required consideration. The epileptic patient must be treated individually rather than "the disease". At the outset the patient, or in the case of a child the parents, should be told the diagnosis and its meaning should be explained. Fears were often met, such as fear of progressive mental deterioration. Epilepsy of itself did not cause that, and reassurance was justifiable, even though in 25% of cases associated brain disease might lead to its occurrence. Loss of confidence might follow the occurrence of seizures in public. Fear of injury or death was minimized by the knowledge that accident-proneness in the epileptic was no higher than among other workers. Feelings of rejection due to worry, parental attitudes or social ostracism, or a feeling of guilt in the parents, might also need psychological treatment. In general, the child or adult should be regarded as a normal human being, without excess sympathy or harsh differentiation. The question whether epileptics should have children often arose. Although heredity was important, the tendency might be recessive genetically, and a variety of "trigger" mechanisms were possible. On an average, with one epileptic parent the chance of epileptic offspring was one in 40; with normal parents about one in 200. How far emotional disturbances might be one of the causative "trigger" mechanisms was a difficult and sometimes important problem. As part of social management, schooling and occupation were discussed, and their importance in treatment was stressed. Dr. Springthorpe, in conclusion, advocated more team work and better education of the public concerning epilepsy, together with a more optimistic outlook than in the past in the light of improved modern knowledge.

A. A. BARR (Western Australia) asked Dr. Selby about the risk of embolism when paraldehyde was injected intravenously.

Dr. Selby replied that it had been used a great deal in London, but he had used it in only four cases; there had been no cases of embolism.

J. A. GAME (Victoria) referred to Grey Walter's work on epilepsy. He said that the electroencephalogram did not in most cases give a definite diagnosis of epilepsy. Psycho-

motor epilepsy was more common than was realized; it was important to distinguish it from the mild cases, as different drugs were used in the different conditions. The electroencephalogram in children often showed localized spikes, and no lesion was found in air studies.

Another speaker said that he dealt mainly with invalid pensioners, many of whom had had inadequate treatment or had been given a wrong diagnosis. From the point of view of employment he considered that the occurrence of less than one fit per month was sufficient to make them employable. Home employment was difficult, and the patient became merely a home "useful".

A. R. PHILLIPS (Victoria) asked if any work had been done in Australia on surgical treatment by hemispherectomy. He also asked whether, if epilepsy was not treated, it would cause deterioration.

Dr. Selby replied that so far as he knew hemispherectomy had not yet been carried out in Australia. Epilepsy and uncontrollable behaviour, especially the latter, were the indications for that operation.

Dr. Springthorpe said that epilepsy *per se* in his opinion did not lead to deterioration; but many epileptics had progressive cerebral abnormality that caused deterioration.

C. M. LEX (Victoria) said that epileptic school children often caused complaints to be made by the teachers, but an excellent correspondence course was available. He gave a warning that the teacher should always be informed that the patient was epileptic, as fatalities had occurred.

Dr. Williams, in reply, said that in his experience few epileptics were killed while they were occupied. The worst and most dangerous occupation was sleeping.

Head Injury and Psychiatric Art.

E. CUNNINGHAM DAX (Melbourne) discussed head injury and psychiatric art, with reference to leucotomy. He said that although the use of psychiatric art for emotional expression and as a diagnostic procedure was not new, certain advances had been made in recent years, and it had been more extensively employed than ever before. Some examples chosen from amongst 30,000 patients' paintings would be described with the help of slides. Illustrative photographs would be on view throughout the Congress. The pictures were characteristic of certain forms of psychiatric disorder; they would be briefly demonstrated as a preliminary to a short study of the relationship between psychiatric art and head injury. Some of the more remarkable examples of patients' paintings after head injury had been obtained after the operation of prefrontal leucotomy, and a series of pictures, some of which had previously been shown at the International Exhibition of Psychiatry in Paris (1950), would be described.

Dr. Dax went on to say that the main features of such pictures were a displacement of the subject matter, a paucity of ideas, and the use of the concrete rather than the imaginative, together with certain evidences of interference with creative ability and aesthetic values. Those were factors which had not been adequately demonstrated by any other means up to date. Not only were the degrees of those variations shown, but it was possible to illustrate the patient's improvement serially over a given length of time after the operation by illustrations which provided visual records. The slides to be shown demonstrated loss of perspective, lack of planning, the ability to copy, the creative spell, emotional changes, and reintegration following the operation.

O. SCHMALZBACH (New South Wales) asked whether there was any variation in the change in drawing according to the site of operation.

Dr. Dax replied that the drawings he had shown were nearly all the work of patients who had undergone trans-orbital operations.

ALEX SINCLAIR (Victoria) asked if the interpretations were taken from the patient or made by the observer.

Dr. Dax replied that some were interpretations put on the picture by the patient herself, others were the interpretations of the observer. Description by the patient was helpful in treatment.

ALAN STOLLER (Victoria) asked if there was any improvement in the symbolism after the operation.

Dr. Dax replied that immediately after the operation there was the result of organic change with the disappearance of schizophrenic features. Later there was considerable change in the subject matter from what it had been before operation, in the same way as there was a difference in dream material.

W. S. DAWSON (New South Wales) asked Dr. Dax whether he had tried giving the patient the task of copying a picture emphasizing accuracy, and comparing the work done before and after operation.

Dr. Dax replied that Hutton and Bassett had done some work on those lines, but he himself had not yet attempted it.

Another speaker asked whether the patient was setting out to create a work of art or to set down his own feelings.

Dr. Dax replied that the pictures were done for an artist, who stimulated the patients and showed them how to get over the technical difficulties. They knew that they were practising for the doctors, and probably tried to some extent to set down their feelings.

Parental Guidance and Enuresis.

JOHN BOSTOCK (Queensland), discussing enuresis, drew attention to the tendency to search for a single remedial measure and to apply it to the enuretic. He found that the intractable nature of a common type of enuresis was due to its complex aetiology. Four main factors were involved. Early frustration by too rigid and too early toilet training created an "enuresis dyad". Physiological stresses were contributory factors. Finally there was the "hoodoo" psychology of the enuretic and a characteristic parental psychology.

Professor Bostock divided treatment into two sections. He said that prophylaxis entailed the education of pregnant mothers into the rationale of a natural toilet training. Furthermore, rigid toilet training largely resulted from housing conditions. It was suggested that that matter receive attention from the Federal level, as it had an important social implication. Treatment of the individual enuretic must be based on the aetiology of the condition. In addition to the usual fluid restriction and general measures, the frustration factor called for close attention. That involved an analysis of home conditions. Sibling rivalry was a common finding. The "hoodoo" psychology of the enuretic was countered by measures calculated to restore optimism and raise morale. The use of the "Watvic" enuresis apparatus gave favourable results in selected cases. Parental psychology required considerable patience and insight. The mothers of enuretics were usually the better mothers, showing considerable perseverance. They needed reeducation in order to overcome their unwittingly frustrating methods. The whole approach should be carefully planned. Professor Bostock insisted that he had dealt with only one type of enuretic. There were others who would need a different approach.

GUY SPRINGTHORPE (Victoria) stressed the frequency of the problem, but said that he thought it was only a part of the presentation. Many children had the same problems without being bed-wetters; one child out of a number in a family might be a bed-wetter with the same parents as the others. Why they were bed-wetters was not known. Enuresis was uncommon in the adult, possibly because treatment had been given up altogether.

J. L. WILLIAMS (Victoria) agreed with Professor Bostock that the lessening of anxiety in the parent was an essential part of the clinical work.

G. SELBY (New South Wales) mentioned a girl, aged twelve years, mentally retarded, an enuretic with *spina*

bifida occulta, who had completely recovered from her enuresis after a diagnostic lumbar puncture.

J. COLEBATCH (Victoria) agreed that the major problem was the problem of the parents. He considered that it was often necessary to put the child into hospital to get him away from the parents.

A. T. EDWARDS (New South Wales) said that the approach should generally be to the parents. He quoted cases in which the child herself was interviewed only once or twice at the beginning of the treatment, and the whole of the following approach was to the parents to solve the problem of their own emotional difficulties.

F. J. GRAHAM (Victoria) said that the symptom could disappear or be suppressed, and that lumbar puncture and hospital admission really led to suppression. Urination had an erotic significance, and he suggested that bed-wetters had more than the usual inhibition of autoerotic activity. Urination also had aggressive components and represented an unconscious revenge.

ALEX SINCLAIR (Victoria) said that one often saw adult enuretics. To him their personality seemed to be well adjusted. They often had a greasy skin and slept heavily, but responded to amphetamine preparations which lightened sleep.

The Temporal Lobe.

LEONARD RAIL (New South Wales), discussing temporal lobe syndromes, said that "a peculiar variety of epilepsy" associated with temporal lobe lesions had been described by Hughlings Jackson in the latter part of the nineteenth century. Electrographic changes in that condition had first been mentioned by Gibbs in 1933, and had been described more fully in the next ten years by Gibbs, Jasper and many others. Jasper, Marsan and Stoll had recently demonstrated by electrographic means communications between the temporal lobes and diencephalic structures. A series of 106 patients with various types of temporal lobe seizures were studied to assess the frequency and distribution of symptoms and their aetiology. Seventy-five complained of disturbances of consciousness, which took the form of (i) short, complete breaks of consciousness, (ii) longer intervals associated with automatic activity, and (iii) episodes of partial loss or confusion in which some contact with environment was maintained. Disturbances of affect and percept such as *déjà vu*, dream states, micropsia and other disturbances more difficult to define, were encountered in 25 cases. Hallucinations, complex in character, were seen in 21, while crude auditory or olfactory hallucinations occurred in 12 instances. In many cases combinations of the symptoms mentioned occurred; but they were described separately because at times one component only was present.

Dr. Rail said that the electrographic changes found in this selected group were as follows: focal 76, diffuse 27. Of the "focal" group, four to seven cycles per second waves were most common, while spikes were the least common manifestations. In the "diffuse" group abnormalities were distributed generally over the cortex, mainly in the four to seven waves per second frequency. The aetiology of the "focal" cases was the following: post-traumatic atrophy, 24 cases; cortical atrophy following vascular lesions, 18 cases; post-encephalitic and thrombophlebitic onset, eight cases; birth trauma, five cases; tumour, three cases; unknown, 12 cases.

The following was the aetiology in the "diffuse" group: post-traumatic cortical atrophy, three cases; birth injury, four cases; idiopathic epilepsy, 23 cases. The electroencephalogram was the most consistent means of distinguishing focal lesions from the idiopathic group. A group of 33 temporal lobe neoplasms was compared with the 106 "focal" and "diffuse" non-neoplastic group. The following observations were made. Only three neoplasms were associated with temporal lobe epilepsy. Twenty of the neoplasms were associated with neurological defects—hemiparesis, aphasia *et cetera*—whereas the atrophic lesions were uncommonly associated with abnormal neurological signs. All but two of the neoplasms were

associated with two to three cycles per second activity of a focal type in the temporal region. Of the atrophic lesions 90% were associated with four to nine cycles per second focal activity at times accompanied by spikes.

JOHN GAME (Melbourne) reviewed 20 recent cases of proven temporal lobe tumours, and stressed the relative frequency of such tumours. He said that the majority were active gliomata, *glioblastoma multiforme* predominating. In most cases the clinical histories were very short, in terms of weeks, and the patients rarely survived more than a few months after operation. Dr. Game said that uncinate epilepsy and homonymous upper quadrantic hemianopia, the features classically linked with temporal lobe tumour, were found in only one-quarter of the cases; but special investigations would reveal the majority of the tumours, once their presence was suspected. Specially modified methods of air encephalography (or ventriculography) and cerebral angiography were the most precise and informative methods of investigation. Of the series of tumours under discussion, 60% were precisely localized by those methods. In a further 30% of cases, the exact localization was achieved by the neurosurgeon after he had turned a correctly planned bone flap. In the 75% of cases in which neither specific temporal lobe epilepsy nor quadrantic field defect was present, there were no other features to indicate with certainty a lesion of the temporal lobe. Analysis revealed that such tumours were apt to be found by the routine investigation of patients with progressive cerebral disease, especially those with a short history. Headache was present in all, pyramidal signs were present in more than three-quarters of the cases, and papilloedema was present in half the cases. The mental disintegration of the patients accompanied rather than preceded their rapid physical decline. Little was learned, therefore, from the study of their mental states. Much might be learned of the highly evolved functions of the temporal lobes by the study of patients with less rapidly destructive temporal lobe disease.

S. SUNDERLAND (Victoria) referred to Hughlings Jackson's work on uncinate fits, and described the temporal loop of Meyer. He said that disturbances of consciousness and emotion were described in association with lesions of the temporal lobe, and it appeared that atrophic lesions rather than tumour tended to be associated with them. He questioned whether the total lobe or part was involved. He referred to work to be dealt with more fully in a later paper by Professor Le Gros Clark, and suggested that the emotional changes were related to the uncinate and hippocampal regions. Professor Sunderland then told the story of two monkeys in the local zoo, who became so unmanageable that they had to be isolated. Under Professor Sunderland's direction a partial right temporal lobectomy was performed on each, as much of the right temporal lobe as possible being removed. This produced dramatic changes, and the monkeys became docile and friendly. Professor Sunderland then showed a film demonstrating the changes in the monkeys.

Congenital Vascular Malformations of the Brain.

L. B. COX (Victoria) discussed congenital vascular malformations of the brain. He said that they could be contained within three main categories: (i) congenital aneurysms of the sacular type; (ii) haemangioma or haemangioblastomata usually of the posterior fossa; (iii) diffuse vascular malformations, often of considerable size, the so-called cirriform aneurysms. Dr. Cox said that he proposed to deal only with the third group, which were formidable lesions and not rare. They might give rise to important symptoms and could exist as part of a widespread miscarriage in development. They had been classified by Cushing and Bailey in one way in 1927, by Dorothy Russell in another in 1931, and slightly differently again by Bergstrand. Dr. Cox thought the existing classifications rather unsatisfactory, and put forward the following simpler working scheme: (i) arterio-venous malformation (the usual type); (ii) cavernous malformations; (iii) telangiectases (which might give rise to the second type). There were also two special types of clinical

importance which might be included in one or other of those types: (a) Sturge-Weber disease, in which a vascular malformation of the brain might or might not be present; (b) a group collected by Wyburn-Mason, which was not mentioned in the Bergstrand classification and had a particular anatomical location. Dr. Cox then discussed the various categories and gave illustrative cases. Referring to the first two types in his classification, he said that there were four main clinical conditions with which the lesions might present—epilepsy, hemiparesis, subarachnoid hemorrhage and headache. All might occur in the one case. In Sturge-Weber disease there were widespread manifestations of malformation, one of which might be a vascular deformation within the intracranial cavity; it presented itself as a disturbance of more than one body system. Epilepsy was almost invariable, as was some degree of mental defect, and congenital glaucoma was frequent. The Wyburn-Mason type was rare. Telangiectases of the brain were possibly the most important type, since they might give rise to the larger malformations. As in other tissues, they might be familial and multiple. They might arise in both the hemispheres and the brain stem. Occasionally they were the source of an unexplained cerebral hemorrhage, or if they were large, of epilepsy.

W. D. CURTIS (Victoria) referred to the necessity for simplifying the classification of the conditions. He agreed that those tumours should not be regarded as neoplasms, though the gradual enlargement of the tumour produced effects similar to neoplasms. Treatment depended to a large extent on the site of the tumour, and relatively few were suitably situated for complete removal. However, the Swedish group held that surgical removal was followed by improvement even in sites apparently most unsuitable. Possibly these tumours were starving the adjacent areas of blood.

A. STOLLER (Victoria) asked if calcification of the cortex frequently occurred apart from vascular malformations.

Dr. Cox replied that histological examination showed that the calcification occurred apart from any vascular malformation.

G. SELBY (New South Wales) asked to what extent capillary malformations might produce small hemorrhages and symptoms. He instanced four cases of recurrent headache associated with transient multiple nerve palsies. In three of them vertebral angiograms revealed small vascular malformations. It was thought that there might have been small leakages.

Dr. Cox, in reply, said that if that was correct, blood should have been found in the cerebro-spinal fluid and the protein content should have been increased, and apparently that was not the case.

The Primitive Structure of the Cerebrum.

W. E. LE GROS CLARK (United Kingdom) read a paper on the primitive structure of the cerebrum.

S. SUNDERLAND (Victoria) said that it was significant that neurology was approaching adolescence, and there was no longer any "compartmentalizing" of the nervous system. It was now recognized that the areas all functioned together.

Sedative Drugs.

A symposium was held on the subject of "Sedative Drugs: Their Uses and Abuses".

F. H. HALES WILSON (New South Wales) discussed the mode of action of sedatives—substances which depressed the action of the central nervous system. In that category were alcohol, morphine, general anaesthetics, bromide, chloral, paraldehyde and the barbiturates. He intended to omit alcohol and the general anaesthetics; the others were used to allay anxiety or, in larger doses, to produce sleep. In using a sedative it was important to know not only the average dose, but its fate in the body, its effects on different parts of the brain and the usual duration of action. One must also know the influence of infancy and old age on dosage, the effects of idiosyncrasy on response,

the signs and symptoms of drug allergy and the signs and symptoms of chronic intoxication. It was also advisable to know the action of any particular sedative on the appreciation of pain, its effect on the motor cortex and its tendency to produce tolerance and addiction. Dr. Wilson then said that knowledge of exactly how a sedative acted on nerve cells and why so little on other tissues was incomplete. He went on to discuss in some detail the present state of knowledge of the mode of action of the barbiturates, bromide, morphine, chloral hydrate and paraldehyde.

W. S. DAWSON (New South Wales) read a paper on addiction to sedatives. He called attention to the increasing amounts of sedatives and also of alcohol consumed for the purpose of relieving nervous tension. He said that it was hard to say whether there was an increasing number of constitutionally unstable individuals in Western nations or whether the changing mode of life which was incidental to the industrial revolution and increasing concentration of population into the cities was responsible for this nervous tension. People dwelling in large towns were less inclined to become physically tired and were more exposed to exciting and irritating stimuli than those living under rural conditions, and nervous tensions and emotional irritability in the parents were apt to foster similar reactions in their children. In regard to addiction to sedatives, attention should be paid to the three aspects of tolerance, dependence and habituation. Amongst the drugs taken for the relief of insomnia and for sedative purposes tolerance was probably slight; there might be some dependence on barbiturates, and, of course, on alcohol, while habituation was most intense with alcohol, and probably slight with bromides and chloral. Barbiturates were used more than any other sedative and abuse was not uncommon. Figures indicated an increasing number of patients admitted to hospital on account of intoxication with barbiturates, the signs of which could simulate those of various organic diseases of the nervous system. While it was desirable to be discriminating in the prescription of sedatives and to watch for evidence of growing dependence, there were always some patients who managed to evade restrictive measures. Treatment in hospital was usually desirable for those suffering from chronic intoxication with sedatives, and a few convulsion treatments often restored the mental stability of those who had been taking increasing amounts of sedatives for insomnia. The prescription of healthier modes of living and guidance regarding particular stress-producing factors should always be attempted.

DAVID ROSS (New South Wales), speaking on insomnia in general practice, said that any discussion relative to insomnia must be somewhat speculative and lacking in conviction until such time as insight was gained into the nature of sleep. He therefore would direct attention to the management of the subject who complained of insomnia rather than to the actual condition itself. Such a course was not without some merit, since insomnia was not a disease *sui generis* but rather a symptom, the significance of which was as varied as the cause.

Dr. Ross went on to say that consideration of any symptom of disease necessarily involved a classification of the various conditions which might give rise to it. His own classification was an attempt to view the complaint of insomnia against the background of the patient's total personality, a procedure which he regarded as essential to its proper management. Of necessity it involved the taking of an adequate psychosomatic history, followed by a complete physical examination and perhaps the use of various ancillary aids to diagnosis. Dr. Ross said that he liked to think that the physician who cared to apply it would find himself in the position of treating the subject with insomnia rather than the insomnia itself. Until such time as they had a clear conception of the nature of sleep, there was no other way to apply such knowledge as they did possess to its best advantage.

Dr. Ross then presented the following classification of insomnia: Group I, real: (1) somatic disease: (a) cerebral conditions, (b) acute infections, (c) pain, cough, dyspnoea, (d) nutritional deficiencies, (e) endocrine disorders; (ii)

psycho-neurosis and psychosis; (iii) environmental factors: (a) the psyche—acute episodes, chronic states; (b) the soma—habits and surroundings, drugs. Group II, apparent: (i) idleness: (a) in youth, (b) in age; (ii) personality defect.

H. T. ILLINGWORTH (Western Australia) said that pethidine in 25 milligramme doses given by mouth was an excellent sedative, and useful to obtain sleep. He stressed the fact also that the administration of hypnotics in general hospitals should not be left to the discretion of the nurses.

E. C. DAX (Victoria) referred to the dangers of pethidine addiction, which had frequently proved fatal. He said that the percentage of bromide in the blood serum which caused symptoms of intoxication varied greatly. There might be up to 350 milligrammes per 100 millilitres without intoxication in the young, whilst 100 milligrammes per 100 millilitres might produce symptoms in the old. The cases of bromide intoxication had diminished in number in England since the introduction of the health service, as patients now obtained their medicine free on prescription and so were less inclined to use patent sedatives.

J. F. WILLIAMS (Victoria) said that he was always worried by the patient who woke at 2 a.m. and was sleepless after that. He regarded that as a warning sign of suicide.

A. STOLLER (Victoria) said that the danger of pethidine addiction could not be exaggerated. He asked Professor Dawson if there were indications for leucotomy in drug addiction.

Professor Dawson, in reply, said that leucotomy would be indicated if there was great tension not relieved by other means.

H. M. MAUDSLEY (Victoria) asked that the rationale of morphine and hyoscine combination be explained. He also asked if it was possible to predict whether hyoscine would produce a manic state. He stressed the abstinence symptoms as a source of difficulty in treating drug addicts.

Dr. Wilson, in reply, said that he could not answer Dr. Maudsley's question, but would suggest that the manic state was possibly due to an individual idiosyncrasy.

Alcohol.

A symposium was held on the subject of alcohol.

JOHN HURT (Victoria), discussing alcohol as a social problem, said that the social problem of alcohol was the relationship of the alcoholic to society. Alcoholism was a product of an unstable personality and a consequence of antecedent mental stress. Three main groups of alcoholics were described: (a) the party drinker, (b) the cyclothymic drinker, (c) the chronic alcoholic. Dr. Hurt said that male alcoholics outnumbered female alcoholics by seven to one, and enumerated the possible reasons for that state of affairs. Racial statistics showed that people belonging to some nationalities had a better head for alcohol than others. Alcoholism was more prevalent in cool than in hot climates.

Dr. Hurt went on to say that the family life of the alcoholic was unhappy, shameful and insecure. The children of alcoholic parents were often neurotic or mentally defective, but some were alcoholics by imitation or identification, rather than owing to an hereditary element. Crime rates were increasing, and alcohol as an antecedent cause was becoming more prominent. That observation included road accidents, robbery, violence and sex offences. Alcoholism might be found in all walks of life, but it predominated in the unskilled class, rather than in the skilled and professional classes.

Dr. Hurt then said that the solution of the problem still eluded them. Banning of any human activity was psychologically wrong, and it might be better to promote sensible drinking by removing the restrictive rules at present in force. American hospitals were establishing special wards for alcoholics, and the members of the judiciary were

taking a more understanding view of the condition. The organization "Alcoholics Anonymous" was gathering strength with its form of group therapy, which produced a strong therapeutic suggestion of cure and an increasing feeling of security. "Antabuse" continued to be effective in selected cases, combined with psychotherapy. Specific treatment might be the duty of the medical profession; but dissemination of knowledge was necessary before the public could grasp the problem to the benefit of the alcoholic and society.

J. J. BILLINGS (Victoria) read a paper on the neurological aspects of alcoholism. He said that the subject would be discussed under three headings—(i) the intake of large amounts of ethyl alcohol, (ii) the malnutrition consequent upon the satisfaction of caloric requirements with alcohol, (iii) the effects of various other poisonous substances likely to be consumed by alcoholics. The immediate effects of alcohol were directly related to the concentration attained in the blood-stream. The distribution of alcohol in the body was rapid; it was rapidly diffused into and from the blood. Varying clinical effects became obvious as the concentration in the blood rose, until at 6.0 to 10.0 milligrammes per millilitre death might occur. Dr. Billings discussed in detail the manifestations of alcoholism. He pointed out that susceptibility to alcohol was variable and might be altered by addiction. Various clinical states might give rise to the suspicion of alcoholic intoxication. The disorders found in chronic alcoholics were predominantly the result of nutritional deficiency. Peripheral neuritis or polyneuritis was of common occurrence, and was not always recognized; the association of nystagmus or diplopia with ataxia might lead to a diagnosis of cerebellar tumour or disseminated sclerosis, or severe weakness to suspicion of a spinal cord disorder. Sensory symptoms were outstanding at first, motor symptoms appeared later, and paralysis might eventually become extreme. Argyll-Robertson pupils were sometimes found in chronic polyneuritis, especially when diabetes was present. Alcoholic polyneuritis was common in women; the drinking habits of men made them more prone to *delirium tremens*. Dr. Billings then referred to the development of Korsakow's psychosis, which usually occurred in an alcoholic suffering from polyneuritis; Wernicke's encephalopathy, which appeared to be due to an inadequate intake of thiamine, might complete the triad. In conclusion, Dr. Billings drew attention to other poisonous substances which might be consumed by alcoholics, such as methyl alcohol. He said that it was unfortunate that the dissemination of knowledge about the dangers of alcohol did little to discourage those with a weakness. The social problem in Australia was enormous, and in that connexion the high alcoholic content of Australian beer was important. The continuing morbidity and mortality were a serious challenge. Most alcoholics appeared anxious for assistance to be rid of their craving.

ALEX SINCLAIR (Victoria) read a paper on the management of alcoholism in out-patient and hospital practice. He said that alcoholism was a symptom of a psychological disorder calling for the same sort of care as that available for other psychoneurotic disorders. In general the results of treatment were not good. There were three main classes of alcoholics—social drinkers, reactive drinkers and neurotic drinkers. In each alcohol served to balance an impaired mental equilibrium. Social drinking helped to make congenial to one another people who would otherwise bore each other. The reactive alcoholic presented the problem of a man having difficulty with his environment. The neurotic alcoholic's chief difficulty lay in the sphere of inner mental conflict. Dr. Sinclair discussed in some detail the three types of drinking which he had mentioned, and said that the management of alcoholism depended on some sort of psychopathological formulation which would act as a basis of principle in treatment. The second essential was to make a diagnostic and prognostic assessment, in order that effort should not be wasted on patients unlikely to respond. The presence of any organic brain disorder or mental defectiveness would limit the value of treatment. The next step was to assess the subject's pre-

alcoholic personality, the nature of environmental pressures and the possibility of influencing them. The expressed needs of the patient should be studied as distinct from those of his family or social contacts. Success in management depended almost entirely upon an ability to form a constructive emotional relationship with the alcoholic patient and to retain it over a long period. The therapist's attitude should be one of liking and understanding of the patient, with a complete avoidance of threats or compulsion except as a last resort. The patient should be seen as often as possible, and given superficial supportive psychotherapy or deeper forms of psychotherapy. Everything possible should be done to turn the attitude of the patient's associates towards permissiveness, affection, understanding and constructive help. Contact with friends, relatives, employers and other close associates must be maintained. Dr. Sinclair then discussed drug treatment, particularly the use of "Antabuse", which he described in detail, pointing out the method of treatment and the dangers and limitations. He stressed the necessity for the patient to agree to and cooperate in treatment with "Antabuse". In regard to the treatment of acute alcoholic toxic states, Dr. Sinclair said that he believed it to be seldom necessary to withdraw alcohol gradually; little harm resulted from abrupt withdrawal. The immediate treatment then was directed towards sedation (barbiturates being avoided if possible), feeding, general nursing and avoidance of infection. Paraldehyde given by mouth or stomach tube was the safest and most effective sedative after control of the patient had been achieved. Nicotinic acid and thiamine might be given. The diet was fluid and rich in protein. The intravenous administration of glucose-saline solution (10%) with small doses of insulin had been recommended. Some workers recommended that oxygen be given. Work had been done which indicated that the adrenocortical hormones had some value; ACTH seemed preferable to adrenocortical extract. "Myanesin" was said to decrease or abolish tremor in *delirium tremens*. Dr. Sinclair, in conclusion, said that he had had good results with electro-shock treatment. However, few patients with *delirium tremens* died if they were given good hospital care, plenty of food and adequate sedation.

N. LEE (New South Wales) asked if there had been any experience of the blood sugar curves in alcoholics in the fasting state. His six subjects had shown falling curves suggesting hypoadrenalism.

B. HUNT (Western Australia) said that the consumption of alcohol per head was increasing rapidly. In 1938-1939 the average annual consumption of beer was 11 gallons; in 1948-1949 it was 17 gallons. He suggested that this might be the cause of the great increase in haematemesis from hepatic cirrhosis. He suggested that choline deficiency was a factor in this. He pointed out that polyneuritis and the Wernicke syndrome in prisoners-of-war in Malaya were due to vitamin B deficiency without alcohol.

G. SELBY (New South Wales), comparing alcoholic neuritis with beriberi polyneuritis in Malaya, said that the blood pyruvate level was raised in almost 100% of cases of both types, owing to the failure of the pyruvate-oxidase mechanism. Thiamine immediately caused this mechanism to return to normal.

G. SPRINGTHORPE (Victoria) asked if there was any evidence that some chronic alcoholics reacted to small amounts differently from the more fortunate members of the community, a small amount facilitating the taking of more alcohol in a short time.

Another speaker asked how the administrative problem was to be solved, as up to 10% of hospital patients were there as a result of alcoholism. He suggested that there should be coordination between physicians, dietitians and psychiatrists.

H. T. ILLINGWORTH (Western Australia) said that the proportion of alcohol in alcoholic liquors had been reduced and a further reduction might assist to solve the problem.

I. J. WOOD (Victoria) stressed that alcoholism was an illness, both psychological and physical, affecting the

nervous system, the cardio-vascular system, the stomach and liver. "Antabuse" should never be given secretly owing to the danger of the reaction if the patient took a large amount of alcohol.

E. C. DAX (Victoria) pointed out that patients in mental hospitals were much less violent than they had been twenty years earlier in England, and he related this to the reduction of the alcoholic content in alcoholic liquors in that country.

H. M. MAUDSLEY (Victoria) said that although alcoholics were really ill, it was impossible to get them into hospital. They were frequently completely non-cooperative, and there were often no legal means of getting them into hospital until a chronic stage was reached. He mentioned a patient who had apparently recovered under "Antabuse" therapy, and who later died after a coma of twenty-four hours' duration, possibly as the result of "Antabuse" and alcohol.

J. L. WILLIAMS (Victoria) regarded the question as a social problem. He said that there had been a considerable change in England in the social habits and sobriety of the people, and this had been purely a social change. He contrasted it with the failure of prohibition in the United States and of the Australian early closing system.

Dr. Sinclair, in reply, recalled only six cases of alcoholism in which both the patient and himself got complete satisfaction. He agreed that the problem needed the combined efforts of the physician, the dietitian, the psychiatrist and often the social worker, and he agreed with Dr. Williams that that was a social as well as a psychiatric problem.

D. W. H. ARNOTT (New South Wales), from the chair, in thanking the speakers, said that in America they had measured the resentment factor, and this gradually arose until the alcoholic got drunk, at which stage it was immediately reduced to a minimum. Alcohol was the only drug that produced this result satisfactorily.

Neurological Aspects of Murray Valley Encephalitis.

E. GRAEME ROBERTSON (Victoria), discussing neurological aspects of Murray Valley encephalitis, said that the illness commenced abruptly with malaise, headache, fever, drowsiness, irritability, vomiting, convulsions (especially in the young) and impairment of consciousness. The onset was usually more rapid in children. Cervical rigidity was constant, and the number of cells in the cerebro-spinal fluid was moderately increased. If improvement began early, recovery was rapid and complete. More frequently the disease progressed, with the appearance of involuntary movements of various types, deep unconsciousness, upper and lower motor neuron paresis, inability to swallow, and respiratory dysrhythmia. A number of the patients who developed that severe condition survived with severe cerebral impairment. The mortality rate was about 40%.

Discussing the pathology, Dr. Robertson said that the only abnormalities evident to the naked eye were in two long-standing cases, and consisted of degeneration of the cerebellum and thalamus. Microscopically there was neuronal degeneration at all levels of the nervous system, including the spinal cord, with accumulation of reactive cells in the early stages. The most constant and severe attack was upon the Purkinje cells of the cerebellum. Focal necrotic areas were evident later in the disease.

S. G. ANDERSON (Victoria) expressed thanks to Dr. Graeme Robertson for help given to the Walter and Eliza Hall Institute in his examination of patients suffering from Murray Valley encephalitis at the neurological level. General evidence appeared to be in favour of an identity between Australian "X" disease occurring in 1917 and Murray Valley encephalitis.

Dr. Robertson, in reply to a question, said that he believed the effect upon the Purkinje cells to be due to direct damage, rather than the result of pressure.

Section of Obstetrics and Gynaecology.¹

President: C. L. Chapman, D.S.O., V.D., M.B., Ch.M., F.R.C.S., F.R.C.S.E., F.R.A.C.S., New South Wales.

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Honorary Secretary: W. J. Rawlings, M.B., B.S., D.G.O., M.R.C.O.G., Victoria.

Methods of Detecting Carcinoma of the Cervix Uteri.

MALCOLM J. L. STENING (New South Wales) discussed methods of detecting carcinoma of the cervix uteri. He reminded those present that Galen, in A.D. 131, had wisely said: "If cancer is to be cured, diagnosis must be early." That advice had been repeated many times in the succeeding centuries and still constituted the best hope for cure, although methods of detection had not improved proportionately to the time of endeavour. There were three variables in early detection—the patient, the growth itself and the attending doctor. In regard to the patient, procrastination was the greatest saboteur of cancer cure statistics, and might be due to ignorance, folly or fear. Education of the public about cancer was the correction of ignorance and to some extent of folly. Fear could be alleviated by consideration of the cervix cancer figures of recognized clinics. The statistics of the Royal Prince Alfred Hospital (King George V Wing) showed that patients treated with the combined method of radium application and radical surgery (Wertheim) had a five-year survival rate of 55.3% with an operability rate of 52%. The remaining 48% represented the group with more advanced growths, and with treatment restricted to radium application alone or only palliative treatment had a five-year survival rate of 17.1%.

Dr. Stening went on to say that the growth itself manifested great variation in its age of onset, degree of activity, extent of spread and site of involvement. It behoved the clinician, with wide variation of cervical morphology, to inspect every cervix visually and to test the ectocervix and endocervix for contact bleeding by means of a Playfair's probe. Dogmatic diagnosis of early carcinoma might be extremely difficult in some cases, and the differentiation from certain forms of chronic cervicitis and other cervical abnormality was fundamental before any form of treatment was considered. The belated and unexpected post-operative pathological report of carcinoma should theoretically never occur, and if it did occur in practice, it was a direct affront to the surgeon and a death warrant to the patient.

Dr. Stening then said that practical methods of detection excluded the use of Antoine's colpomicroscope and Hinselman's colposcope. The purpose of Schiller's iodine test was to detect the early stage of cancer occurring in an intact epithelium. Cancerous areas were glycolytic, and contained after the application of a watery iodine solution (Gram's or Lugol's iodine and not the tincture) characteristic white or unstained areas. The use of the test was merely an adjuvant in diagnosis or in localizing areas for biopsy and confined to ectocervical lesions prior to ulceration of the epithelium. Dr. Stening went on to describe cytological methods of diagnosis according to the technique of Papanicolaou or Ayre. He said that the scrapings from the surface biopsy of Ayre could be described after appropriate preparation as normal, inflammatory, pre-cancer-cell type and cancer-cell type. Although diagnosis by cytology was a sensitive method of detection, its reliability was largely dependent on the experience of the pathologist in that particular method. So long as the advised dictum was followed that positive cytological findings should be confirmed by tissue biopsy, no harm

would result, but benefit would accrue from very early detection. For practical purposes under all conditions the final arbiter of diagnosis was, as always, the tissue biopsy. The site or sites of biopsy should be carefully selected and might be aided by Schiller's test in early cases. The *sine qua non* of all cancer investigation and treatment was that diagnosis had always to be verified and finalized by tissue biopsy; there was no place for equivocation in that regard.

Dr. Stening said that the last variable, the part played by the doctor who first examined the patient, was an integrating and coordinating one and demanded in all cases vaginal examination, with visualization of the cervix and determination of contact bleeding and, if it was indicated, tissue biopsy.

C. L. CHAPMAN (New South Wales) agreed that an early and accurate method of detection was not available. Cancer detection clinics might find an occasional case, but he deprecated the dramatization necessary in those clinics. Papanicolaou had stated that it took ten years to train his cytologists. Previous speakers had not mentioned difficulty in diagnosis in pregnant women; peculiar cellular changes occurred in pregnancy, and there was need for biopsy. Even then there was no such thing as unequivocal histopathological diagnosis, because sometimes the biopsy findings were not definite, and clinical diagnosis was still of importance. Regarding the treatment of non-invasive carcinoma, there was still a difference of opinion about the degree of surgery required. Regarding the site for biopsy, he agreed that Schiller's test was of value, but said that a number of pieces might be needed, and generous samples were required.

R. MATTERS (South Australia) said that Meigs and Te Linde in America used diagnostic centres, and they were also used on the Continent. He had been impressed recently by the clinic in Oslo, where they had a special clinic for teaching general practitioners. He also saw another special type of colposcope in Vienna. He made a plea for the education of all general practitioners, and the more frequent use of the speculum.

A. MCQ. THOMSON (Victoria) put forward the views of the general practitioner. He said that he was always on the lookout for any sign of malignancy, and tried to follow up such signs. The difficulty was to persuade patients in the cancer decades to have regular examinations and to have biopsies performed in any suspicious cases; he found it very difficult to get them to do it. He asked advice about the amount of biopsy material to take, and showed an instrument for coning out endocervical biopsy material.

W. J. RAWLINGS (Victoria) thought that Papanicolaou tests often led to false trails. He said that he also had used the instrument demonstrated by Dr. Thomson.

F. J. BROWNE (New South Wales) warned that the cervix should never be cauterized without prior biopsy, and that the biopsy should be taken from the squamo-endothelial margin.

R. FOWLER (Victoria) said that early diagnosis was governed by one axiom and two postulates; the axiom was that the initiative always lay with the patient. He agreed that propaganda was a two-edged sword. There was always the risk of producing cancerophobia. In an investigation

¹The meetings held by the Section of Obstetrics and Gynaecology with the Section of Paediatrics, and with the Section of Radiology, have been recorded.

carried out at the Central Cancer Registry, they had found that the average length of time before symptoms were reported was six months. Dr. Fowler said that the first postulate he wished to put forward was that there must be an alert medical profession; the second that there must be expert auxiliary services, particularly on the pathological side.

R. NATTRASS (Western Australia) stressed the need of prophylaxis in post-partum treatment, to prevent the development of chronic cervicitis. He suggested to Professor Browne that surely he did not think that all cervixes should be submitted to biopsy before being cauterized.

Professor Browne agreed with Dr. Natrass.

R. WORCESTER (Victoria) said that in his opinion histopathological diagnosis was more important than clinical. It was the only way of discovering very early cases, and in those cases the treatment need not be so radical.

J. W. JOHNSTONE (Victoria) said that the theory that there was a sharp change from non-cancerous to cancerous tissue was no longer tenable. It would appear that the change could take many years—up to six—and could be well advanced by the time symptoms were obvious. Early detection could be accomplished only by routine examinations. Regarding the development of carcinoma in the residual cervix, he said that the figures given were 1%; that could possibly be due to carcinoma *in situ* being disturbed by operative trauma.

Dr. Stening, in reply, said that no one knew how long it took for carcinoma *in situ* to become invasive. One must be guided by appearance. If cervical erosions were heaped up or granular or friable, biopsy must be taken. If one considered the general incidence of carcinoma of the cervix as being 4.6 per thousand, then the figure of 1% in the residual cervix was no greater than that of the general rate.

Dr. Chapman, from the chair, said that he had only one comment to offer, and that was that in his experience carcinoma in the residual cervix had been seen in only one in 500 cases.

Clinical Diagnosis of Vaginal Flora.

W. W. WILSON (Tasmania) said that his paper would concern itself with the description of a simple clinical method of investigating the vaginal flora. The objects in view had been (i) to examine a cross-section of obstetric and gynaecological patients together with vaginal and cervical smears, and to estimate the pH of secretions, (ii) to attempt to correlate microscopic findings with the clinical picture, (iii) to search for recurring patterns in the microscopic field, and (iv) to diagnose some of the simpler infections. He went on to describe a method by which microscopic slides were ruled by diamond pencil into five compartments and numbered serially. Five smears were taken from each patient—from the vaginal wall, from the vaginal pool, from the cervical mucosa, from the cervical mucus, and from the epithelial junction area. The slides were stained by Jensen's modification of Gram's stain and examined microscopically, and the findings were carefully recorded in a ledger. The pH of the vaginal mucosa and of the cervical mucus was estimated with polyvalent litmus paper. The microscopic fields were recorded under the following heads: (a) epithelial cells, (b) pus cells, (c) organisms, (d) debris. The variations and relative association of those factors proved a worthwhile study and demonstrated a number of interesting points. Dr. Wilson went on to compare and contrast the clinical and microscopic appearances of monilia and trichomonal vaginitis, pointing out amongst other factors that Döderlein's bacillus accompanied the former but not the latter, and that there was no excuse for confusing those conditions clinically. He then briefly discussed the following matters: (i) cyclical and seasonal changes in epithelial cells; (ii) the relative numbers of pus cells and their state of breakdown, and the association with virulence of pathogens; (iii) the complete change of flora

that occurred in the subject with pregnancy, or with changing years; (iv) pleomorphism and antibiotics; (v) the freedom of cervical mucus from organisms; (vi) slight variations in pH; (vii) the necessity for using cultural methods for diagnosis. Dr. Wilson, in conclusion, said that the vaginal flora was subject to great variation in health and disease. The following factors influenced the picture: (a) the general health, (b) the condition of pelvic organs, (c) vaginal epithelial cells, (d) trauma, (e) exudates, (f) cyclical changes, (g) commensals and pathogens, (h) response to treatment.

G. SPENCE SMYTH (New Zealand) stressed the part that foreign bodies played in the production of vaginal discharge, particularly since the development of the common use of vaginal tampons which might be forgotten. He said that that in one case had led to persistent vaginitis which failed to respond to treatment, and two years later the patient was found to have occluded Fallopian tubes. He also agreed that in his experience monilia infections were not more frequent in diabetic patients. He quoted work in which inoculation of *Trichomonas vaginalis* into healthy vaginas had failed to cause pathological change and resulted in death of the organisms.

LORNA LLOYD-GREEN (Victoria) stressed the view that full investigation of vaginal discharge was better left to the trained pathologist. Such work as carried out by Dr. Wilson was impracticable under ordinary conditions of practice. In many instances infections with monilia and trichomonas did not respond to specific treatment. In Dr. Lloyd-Green's experience the combination of moniliasis and glycosuria was common.

S. D. MEARES (New South Wales), in congratulating Dr. Wilson on his paper, said that in Sydney Dr. J. N. Chesterman and Dr. Muriel McIlraith had both published original work on the flora of the female genital tract and its association with puerperal sepsis. He went on to say that several points in Dr. Wilson's paper called for comment. The light must be good. A throat torch gave insufficient light. Daylight was often best. It was better not to lubricate the speculum even with water. The whole surroundings of the introitus and vagina must be studied, especially the urethra, Skene's ducts and Bartholin's ducts. Glycosuria was often found in patients with monilia infection, especially if repeated search was made. The value of the work would be greatly enhanced if its scope was widened to include investigation of the partner, and the examination of vaginal smears from pre-pubertal and post-menopausal women.

Physiotherapy in Obstetrics.

GRACE CUTHBERT-BROWNE (New South Wales) showed a film illustrating the use of physiotherapy in obstetrics.

Extraperitoneal Caesarean Section.

G. BEARHAM (Victoria) read a paper on extraperitoneal Caesarean section and illustrated it with a film.

F. J. BROWNE (New South Wales) was of the opinion that there was a place for the operation of extraperitoneal Caesarean section, but it was a limited one and the operation should not replace the ordinary technique. He considered that its place would be where application of forceps had failed, or there was a prolapsed arm or infection.

G. P. FITZGERALD (New Zealand) said that he had never used the technique and considered that the disadvantages of difficulty of technique and of control of haemorrhage were greater than the advantages of not soiling the peritoneal cavity. He also said that if a patient needed to have her Fallopian tubes tied, then that would be difficult with the extraperitoneal technique.

A. F. TAYLOR (Victoria) said that the operation could be performed in a small hospital and that bladder damage if recognized caused no difficulties.

W. J. RAWLINGS (Victoria) said that with the development of antibiotics there was less need to perform the extraperitoneal operation and stressed the fact that it was not an easy procedure.

ROBERT FOWLER (Victoria) could see no advantage in avoiding opening of the peritoneum. He said that if the object was to exclude infection, that was not achieved by actually opening the cavity—the infection would spread subserosely. As long as the lower segment was opened, drainage from the wound would occur *per vaginam*.

DORIS C. GORDON (New Zealand) said that she preferred the transperitoneal technique and asked Dr. Bearham how long he needed to keep his patients in bed and in hospital.

W. LEMMON (Victoria) considered that the technique was difficult and that the indications were few; to perform the operation well one would need to use it exclusively, and that in his opinion was not in the best interests of the patient.

Dr. Bearham, in reply, said that if there were no complications the patient was up on the second day, was walking by the fourth or fifth day, and could go out of hospital from the ninth day onwards. If the bladder was damaged, it must be drained for ten days, and then four to five days were needed for regaining of bladder control. He defended his technique by saying that he operated through an area which was less vascular; the main advantage in not opening the peritoneal cavity was the absence of adhesions. If tying of the Fallopian tube was necessary, that could be done by opening the peritoneum after the uterine incision was closed.

Dr. C. L. CHAPMAN, from the chair, said that he would not take sides on the question, but that he had met with two cases in which the bladder had been damaged unknowingly, and the patients had come back with the peritoneal cavity full of urine. That, however, had been treated by means of an indwelling catheter and simple drainage of the peritoneal cavity through a small incision, with good results.

The Abnormal Cervix.

R. G. WORCESTER (Victoria) read a paper on the abnormal cervix. He said that abnormalities of the cervix constituted a large proportion of the conditions met with in practice. Chronic cervicitis was responsible for many of the common and irritating complaints of women and appeared to be nearly always the precursor of cervical cancer. After describing a number of important points on the anatomy and physiology of the cervix, Dr. Worcester dealt with individual abnormalities. He said that acute cervicitis was uncommon and was usually associated with infections of the uterine body, being due to puerperal and post-abortion causes or instrumentation; pelvic cellulitis and parametritis often followed. Treatment was rest in bed and correct antibiotic therapy. Chronic cervicitis was common and usually followed minor injuries and infections associated with childbirth and abortion. It could also be due to instrumentation and to the use of stem pessaries and the gold spring pessary. The usual symptom complained of was persistent and sometimes irritating vaginal discharge. Other common complaints were backache, lower abdominal pain, dyspareunia, discomfort in the urinary tract and a bearing-down sensation or pain in the rectum. Menorrhagia, metrorrhagia, dysmenorrhoea, pruritus vulvae and sterility were less common. Chronic cervicitis was often a focus for *Trichomonas vaginalis* and monilia, and it could cause general ill-health and, rarely, focal sepsis. Speculum examination was necessary, but in some cases of endocervicitis the only abnormality was a thick, glairy, mucopurulent discharge from the cervical canal. In most cases, chronic inflammation was evident, with cervical erosion, ectropion, eversion, or retention cysts. Dr. Worcester said that in view of the possible relationship of the condition to cancer, treatment was most important, and it should be preceded by biopsy in any doubtful case. Cauterization was a satisfactory form of treatment, diathermy being the best agent for carrying

it out; for chronic endocervicitis conization or Sturmdorf's coning of the cervix was better, but dilatation of the cervix and cauterization of the endocervix with diathermy might be satisfactory. Amputation of the cervix and occasionally total hysterectomy were treatments of choice in particular cases. Dr. Worcester described the after-treatment to follow cauterization and said that in nearly every case results were excellent. He went on to refer to the cervical stump, left after subtotal hysterectomy. He said that it could cause all the symptoms and signs associated with cervical abnormality; a blood-stained discharge occurred frequently. The risk of development of carcinoma in a cervical stump was the chief argument for total as opposed to subtotal hysterectomy. The stump might also be the seat of chronic infection and other changes. When a stump caused symptoms, the best treatment was excision *per vaginam*; the alternative was cauterization. Dr. Worcester referred to changes in the cervical epithelium and the development of squamous metaplasia, leukoplakia and non-invasive carcinoma. He considered that non-invasive carcinoma should be treated as early cancer, panhysterectomy or a modified Wertheim's operation being carried out. Cervical polypi should be treated with respect, as they were sometimes associated with uterine cancer. In conclusion, Dr. Worcester urged complete examination of the cervix uteri in all women over the age of thirty-five years. That, with the taking of biopsies when necessary, would help the early diagnosis of cancer and save many lives. The method could not be replaced by the vaginal smear technique. Furthermore, routine treatment of cervicitis by the simple means suggested would mean less cancer of the cervix and elimination of many irritating symptoms.

S. D. MEARES (New South Wales), in opening the discussion, said that it was first necessary to define the abnormal cervix. Surely a cervical erosion was not an abnormality, for it was found in the fetus, in virgins and in more than half the women attending ante-natal clinics. Further, Nabothian follicles were not abnormal, for they were shown in illustrations in some old anatomy books and were very common. If one treated every cervix showing erosion or Nabothian follicles, one would have little time left for other gynaecological work. In discussing the list of symptoms that Dr. Worcester stated were due to chronic cervicitis, Dr. Meares said that such symptoms as backache, lower abdominal pain, dysmenorrhoea, dyspareunia, bearing-down pain, pain in the rectum and menorrhagia were not caused by chronic cervicitis *per se*. Except for pain caused by dilatation of the canal, the cervix was relatively insensitive. Concerning Dr. Worcester's reference to Worrall's method of hysterectomy, Dr. Meares said that he rarely used the method himself, but frequently saw it employed in Sydney. Carried out as described by Worrall, the method had none of the disadvantages attributed to it by Dr. Worcester, and Dr. Meares could only conclude that Dr. Worcester had not followed Worrall's technique in detail. Dr. Meares went on to say that great changes occurred in the cervix during pregnancy, and any minor lesions became more pronounced—so much so that one at times had to consider the possibility of malignant change. Biopsy should be performed. Even the gross hypertrophy of the epithelial structures sometimes simulated carcinoma. Leucoplakia of the cervix, though uncommon, must not be forgotten. It was a pre-malignant condition, and when proved histologically should be treated as such. Usually it was best treated by amputation of the cervix. In conclusion, Dr. Meares asked Dr. Worcester why it was very rare for carcinoma to arise in a decubitus ulcer of the cervix with complete prolapse.

B. W. GRIEVE (New Zealand) suggested that in some cases treatment with the cautery was not radical enough, trachelorrhaphy being indicated, and that trachelorrhaphy also was indicated when treatment with the cautery had failed. He considered that when hysterectomy was necessary in parous women, total hysterectomy should be performed.

R. V. MACFADZEAN (New South Wales) considered that retroversion played a part in chronicity of cervical infections. He asked Dr. Worcester whether he used chemical cauteries or always diathermy.

J. W. JOHNSTONE (Victoria) said that there was difficulty in distinguishing between the normal and abnormal cervix and that erosions were not necessarily infective in origin.

C. K. CHURCHES (Victoria) spoke of the risk of secondary hæmorrhage after use of the cautery and said that care was needed.

H. G. FURNELL (Victoria) asked Dr. Worcester if he did not find that a certain percentage of his patients complained of pain during treatment with the cautery to such an extent that it could not be continued without anaesthesia. He also asked if in the case of a large lesion he dealt with it at one sitting or part at a time.

N. H. W. SAXBY (New South Wales) asked Dr. Worcester what was his incidence of complications after cauterization, and what methods he used in treating cervicitis during pregnancy.

L. P. SAMPSON (Queensland) asked Dr. Worcester if he considered that carcinoma always developed at the squamocolumnar junction. He had seen lesions away from that area and requested the information because of the need for biopsy. He thought that leucoplakia was rare.

Dr. Worcester, in reply, considered that the cervix was abnormal when symptoms were complained of, and erosions under those circumstances should be treated. He could not recall having seen a case of leucoplakia, but under such circumstances would amputate the cervix. His after-treatment was with triple "sulpha" cream and sometimes antibiotics. In reply to Dr. Furnell, he said that he sometimes treated the whole lesion in hospital, and sometimes he treated it on a number of occasions, doing part at a time. During pregnancy he treated cervicitis by means of puffing with penicillin-sulphonamide powder. For small lesions he used chemical cauterization, but he preferred diathermy for larger lesions.

C. L. CHAPMAN (New South Wales), from the chair, said that speakers had failed to emphasize the fact that the cervix was only one portion of the body and that diet, administration of vitamins and marital rest were important factors in treatment.

Hæmorrhages during the Ante-Natal Period.

ROLAND NATTRASS (Western Australia) discussed hæmorrhage during the ante-natal period, which, he said, had always been a major obstetrical problem; evidence indicated that, equal with toxæmia, it was the most frequent cause of maternal death. Also, as a contributory cause of maternal death in infection, hæmorrhage played an important role. The mortality statistics of Western Australia during the last ten years, with 240 deaths in 112,584 deliveries, assigned 22.5% of the deaths to hæmorrhage, whilst toxæmia accounted for 24%. Some of those deaths would have been preventable if it had been realized that bleeding during pregnancy was never normal, and that "emergency cases" could sometimes be avoided if the significance of the first bleeding was appreciated. Among 3337 deliveries at the King Edward Hospital, Perth, in 1951, hæmorrhage was a noted ante-natal complication in 54 cases, of which 16 were proved cases of *placenta prævia* (fortunately there were no maternal deaths). Because hæmorrhage was so frequent in obstetrics, it was essential that an adequate supply of whole blood should be on hand, and every obstetrician should realize that delayed obstetric hæmostasis and delayed replacement of lost blood would be responsible for some maternal deaths. In a certain number of those cases, simple obstetric procedures and therapy would have prevented such calamities, provided that diagnosis and treatment had been prompt. Therefore they must all have a keen realization of the dangers inherent in obstetric hæmorrhage; preparedness for it should start

at the first ante-natal visit. At that time, every patient should have her blood group and Rh factor determination made and entered on a card for her to take into hospital. If that was not done, too much precious time might be lost on an emergency hæmorrhage at a later date. Unless those precautions were taken, many more patients who could have been saved by prompt and adequate use of whole blood would continue to die from shock and hæmorrhage. Hæmorrhage could not always be prevented, but the effects of blood loss were usually controllable. Again, it was essential to appreciate fully the amount of blood which the patient had already lost, and one had always to remember that, after prolonged or frequent small bleedings, slight additional loss or the trauma of obstetric manipulations was sometimes enough to cause serious collapse. Dr. Natrass then discussed the diagnosis and treatment of obstetric hæmorrhages; he referred to the most common of all, threatened miscarriage, to the less common, but dangerous, ruptured ectopic pregnancy, and to the all-important *placenta prævia* and accidental hæmorrhage.

F. J. BROWNE (New South Wales), in discussing the treatment of threatened miscarriage, said that he never used hormones, but put the patient to bed, gave her morphine and kept her there for a week after all bleeding had ceased. He did not like curettage in the treatment of septic abortion; he only cleared out the uterine cavity with his finger after treatment with antibiotics. Professor Browne agreed with Dr. Natrass that if an ectopic gestation was missed, it was because of an incomplete history. It was also important to empty the patient's bladder before a bimanual examination was made, even if the obstetrician passed the catheter himself. Professor Browne agreed that X-ray localization of the placenta was useful in 50% of cases. He did not attempt to decide when a patient should be delivered, and he did not perform vaginal examinations unless there were indications for active treatment. That consisted of either artificial rupture of the membranes if the patient was in labour and the application of a binder when the placenta did not cover the os, or otherwise Cæsarean section. In his opinion the presence of retroplacental clot did not necessarily cause continuation of shock.

H. M. FISHER (Tasmania) said that he abstained from vaginal examination in cases of threatened miscarriage, and used vitamin E in therapy and not hormones. He thought that packing had a place in country practice as a temporary measure to enable a patient to be transported to hospital, but it had no place in the treatment of *placenta prævia*. He disagreed with the classification of accidental hæmorrhage into concealed, revealed and combined; he thought that all were only stages in the one process and that those terms should be abandoned. Patients not in labour and suffering from accidental hæmorrhage were in grave danger. In summing up, Dr. Fisher said that transfusion and masterly inactivity with watchful expectancy must be the keynotes of treatment; but one had to be careful that it did not go on to ignorant and passive neglect.

MARGARET MACKIE (Victoria) gave figures of patients treated at the Women's Hospital. She attributed the improvement in results in ante-partum hæmorrhage to expectant treatment, and to the greater use of Cæsarean section. In considering the ætiology of accidental hæmorrhage, Dr. Mackie said that there was no evidence of toxæmia in at least 50% of the cases reviewed; a disturbing feature was that there was a small group in which accidental hæmorrhage followed external version or attempted version, and in this group there was a high foetal death rate. She agreed that accidental hæmorrhage was the greater problem.

C. L. CHAPMAN (New South Wales), from the chair, said that a tremendous advance had been made, owing to expectant treatment and to the use of Cæsarean section in a greater number of cases.

Section of Ophthalmology.

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President's Address: Eclipse Blindness.

JAMES A. F. FLYNN (New South Wales) chose as the subject for his president's address "Eclipse Blindness", and began by explaining that the term was inaccurate. He said that it should be called solar retinitis or photoretinitis, because the sun was the direct cause and patients were not blinded. The lesion was caused by the heat generated in the sun's image at the macula by the visible and infra-red rays. Flynn and Eccles had found that with an exposure of 30 seconds lesions were produced when the radiation incident on the retina was above 50 calories per square centimetre per minute, but not when it was below 40 calories per square centimetre per minute. Danger lay in the fact that the approach of an eclipse of the sun was publicized in the Press. People became interested and gazed at the sun. Sometimes they used "filters" which were popularly believed to be safe, but which gave no protection at all. The ophthalmoscopic appearance of the macular lesion depended on the severity of the burn and the time interval after the injury at which the examination was made. Actual disintegration and coagulation of the different layers of the retina and of the choroid occurred at the site of the burn. Later hemorrhage occurred into the damaged area. As this cleared, permanent ophthalmoscopic changes became visible, and in milder cases these did not extend beyond pigmentary disturbances of varying degree. In more severe cases the damage might be sufficient to lead to the formation of a hole at the macula. Obviously there was no cure once a lesion had been caused. Dr. Flynn said that protection could be given by wearing glasses with specific absorbing properties, but that these were not available to the public generally. For safety the transmission should be something of the order: visible transmission, 5%; infra-red transmission, 5%. Higher visible transmission could safely be permitted, provided that the infra-red transmission was reduced proportionately—for example, visible transmission 8% and infra-red transmission 2%. Dr. Flynn reviewed 80 histories of solar retinitis caused by the eclipse on August 1, 1943. He grouped the cases according to eight different ineffective methods which had been used, and gave details concerning some of them. He then referred to publicity undertaken by the Ophthalmological Society of Australia in connexion with later eclipses than the one in 1943, and claimed that it had been effective. The method of viewing the eclipse which was advocated was to make a pinhole in a piece of cardboard and to hold it in such a way that the sun shone through the pinhole onto a second piece of cardboard held a few feet away. The observer saw an image of the eclipse on the second piece of cardboard. Dr. Flynn concluded that the Ophthalmological Society of Australia was putting into effect one of its objects: "to provide an authoritative body of opinion on matters concerning vision and to promote the visual health of the community".

The Practitioner's Guide to the Fundus Oculi.

JOHN FOSTER (United Kingdom) read a paper on the practitioner's guide to the *fundus oculi*. He said that medical practitioners obtained little benefit from the use of the ophthalmoscope, yet that instrument provided an easy sampling of both vascular and nervous systems. Normal variations needed to be distinguished from abnormalities. The amount of pigment in the retinal background usually matched the person's general colouring. Some developmental anomalies of no significance might be mis-

taken for serious lesions—for example, the "physiological cup" did not reach the edge of the disk as in glaucoma, medullated nerve fibres should never be mistaken for exudates, in "pseudoneuritis" the edges of the disk were blurred but never raised. Certain changes in the fundi were characteristic of certain diseases, but their incidence might be surprisingly low. Only 7% of tabetics showed primary optic atrophy, only 15% of diabetics showed retinal hemorrhages and exudates. Therefore the absence of retinal changes could not be used to exclude general diseases. Since the time of Virchow students had been exhorted to "think pathologically" and conjure up the histological picture; but during ophthalmoscopy it was better to "think pictorially" in certain limited terms, such as blurring, pallor, cupping (of the optic disk), red spots and white spots (sharp or fluffy), black borders or irregular squiggles of pigment. Experience was necessary to interpret these appearances, but help might be obtained from books containing pictures of fundus lesions. Dr. Foster showed numerous slides and tables to illustrate the features he had mentioned.

The Changing Attitude to Developmental Abnormalities.

IDA MANN (Western Australia), in her paper on developmental abnormalities, said that ophthalmology had always benefited by advances in related clinical and non-clinical subjects. Such advances in animal genetics, biochemistry, experimental embryology and prenatal pathology had led to a changing attitude towards the causes of abnormalities, towards the mechanism of their production and towards the methods of dealing with them. Causes and classification were now shown to be influenced by new knowledge: (i) of the nature of the genes, (ii) of the part played by nutrition, (iii) of the influence of maternal illness, and (iv) of the mechanisms of production of multiple apparently unrelated abnormalities. Dr. Mann then gave the following classification by cause. (i) Genetic: (a) affecting pre-natal development, (b) affecting post-natal development, (c) affecting adult maintenance of function. (ii) Genetically determined but environmentally produced. (iii) Environmental: (a) deficiency of vitamins, (b) deficiency of trace elements, (c) excess of trace elements, (d) infections of the mother during the organo-genetic period, (e) infections of the mother (and fetus) after the third month, (f) uterine hemorrhages (early and late), (g) endocrine disorders of the mother, (h) prematurity. (iv) Sporadic—cause at present unknown. Dr. Mann described the part played by the study of animal genetics and the embryology of hereditary defects in animals in elucidating some puzzling human conditions, and pointed out that many so-called degenerations were also hereditary. She touched on the question of treatment along lines of developing residual function rather than of restriction of activity.

ALGERNON B. REESE (United States) complimented Professor Mann on her paper, and said that he was interested in her suggestion about retrolental fibroplasia.

J. BRUCE HAMILTON (Tasmania) said that he had been most interested in Professor Mann's advancing conception of congenital ophthalmic abnormalities. Dr. Hamilton said that he had three comments to make, under the headings of toxoplasmosis, retrolental fibroplasia, and prognosis and education. He suggested that as toxoplasmic retinitis was usually accompanied by microphthalmos, the effects of toxoplasmosis, a protozoan disease, should be moved into the period between the sixth and eighteenth weeks of

intrauterine life. Retrolental fibroplasia should be moved into the classification of diseases of non-bacterial origin produced by an activator. Finally, Dr. Hamilton endorsed Professor Mann's plea for a cheering prognosis to the parents and a sensible educational programme, and urged that it should be heeded by everyone.

ARTHUR D'OMBRAIN (New South Wales) said that it seemed to him that retrolental fibroplasia was a proliferative process, characterized as it was by initial stages of vasodilatation and neovascularization. An immature organism—a premature baby—was suddenly bereft of the growth-stimulating and growth-regulating factors contained in the mother's blood serum. That immature organism, suddenly and prematurely jolted into independent life, then made an effort to complete the retinal structure, and an uncontrolled proliferative process resulted, with its subsequent cicatricial changes. Dr. D'Ombrain suggested that an immediate transfusion of the mother's blood serum or of the blood serum of a pregnant woman might be worth a trial.

HUGH RYAN (Victoria) said that he found the grey areas at the periphery of the retina, about which Professor Mann and Dr. Reese had spoken, to be common in premature babies. They appeared to be present in over 50% of babies weighing under three and a half pounds at birth, and in 10% to 15% of full-term babies. He thought that the grey areas represented delay in coaptation of the two layers of the retina, and he had produced histological evidence to support that view. Dr. Ryan went on to say that prior to the installation of an oxygen cot at the Women's Hospital, Melbourne, for the treatment of premature babies no case of retrolental fibroplasia had occurred. In the first two years following the installation of the cot over 20 babies had developed retrolental fibroplasia. Two years before Congress the use of excessive oxygen had been curtailed and no further cases of the disease had been reported. Dr. Ryan said that he was surprised at the good visual results which occurred in eyes affected by retrolental fibroplasia, in which in the early stages of the disease the outlook appeared hopeless.

ADELAIDE GAULT (Victoria) said that only one case of retrolental fibroplasia had occurred at the Queen Victoria Hospital since the "Humidicrib" had been substituted for the use of an oxygen tent. The one case was that of a baby admitted to the hospital as an "emergency" after transport in an ambulance with administration of oxygen.

Professor Mann, in reply to Dr. Hamilton, said that the term "activator" was used by bacteriologists in a specific way to mean a disease caused by a virus or bacterium which required to be activated by a non-living agent before it could produce the disease. Professor Mann said that it was at least known that trauma might act as the precipitating factor in interstitial keratitis. In general she thought that the environment of premature babies should approximate as nearly as possible the intrauterine conditions during the last month of pregnancy.

Curiosa Ophthalmica.

JOHN FOSTER (United Kingdom) read a paper on *curiosa ophthalmica*, in which he dealt with oddities in ophthalmology of historical, therapeutic, anatomical and animal interest, and gave references to trickery and fraud associated with the eyes and the so-called "extra-retinal vision". Dr. Foster said that the code of Hammurabi of Babylon (2081 B.C.) quoted the first scale of surgical fees—10 shekels to operate on the eye of a nobleman, five for the freed man and two for the slave. But the penalty for the loss of the eye of the freed man was the loss of the eye of the surgeon. With a meibomian cyst or a cataract the scale of fees was extraordinarily high, the shekel being comparable with the annual rent of a house. The Iliad was strangely deficient in words of colour naming. In ancient Rome, among the ophthalmic curiosities there it appeared that squint was a sign of beauty, so it was not improbable that Venus herself had a convergent strabismus, while Janus had a special gift of three eyes.

Dr. Foster then said that mediæval Europe presented some distinguished ecclesiastical authors; thus Pope John XXI wrote on ocular hygiene, John Peckham, Archbishop of Canterbury, wrote on visual optics, and King Louis of France, the saint, founded the Quinze-Vingts hospital in A.D. 1260. Truly or not, it was said that some of the mediæval religious preferred a life of saintly blindness rather than be distracted by worldly seeing. Saint Lucia of Syracuse, close to A.D. 300, achieved two ends by her bilateral avulsion of the eyes. She repelled an ardent lover who disturbed her novitiate and then concentrated on her religious life. The story went that she sent to the lover her eyes on a plate transfixed with a meat skewer. Actually, though this story was rightly disbelieved, occasionally today the demented avulsed an eye, using a spoon or a fork for the purpose.

Dr. Foster went on to say that glasses for correction of refraction were known in the fourteenth century and were valued at 2s., or the cost of a cow. The ophthalmic surgeons of today, obliged to test sight, would thoroughly agree with the inscription over the tomb of Salvino d'Armato:

He invented Spectacles.

God forgive him his sins.

The evil eye of antiquity possibly had no basis in fact and might have been the outcome of anti-clerical or political prejudice, but it was true that within very recent years "Izzy, the Eye" in New York received \$50 per fight for gazing at the boxer against whom Izzy's employers were betting. Therapeutics covered a queer range of things animal, vegetable and mineral. Perhaps the eye-stone was the most curious. It was a tiny pebble from the stomach of the crayfish, which was dipped in vinegar and inserted under the upper lid. By its movements it would soon dislodge a superficial corneal foreign body.

Dr. Foster said that card tricks came within the scope of the curious in ophthalmology. There were available packs which disclosed secret markings when viewed through coloured glasses or a green eyeshade. A curious by-product of modern ophthalmology was the trickster who made an honest living by wagering that he could put a lighted cigarette in his eye, that organ being duly protected with a contact lens. There were other types of swindles and frauds, especially relating to artificial eyes; a hollow glass eye might be used for the smuggling of precious stones.

Turning to animal curiosities, Dr. Foster said that they included the surgery of the animal eye and even the fitting of a prosthesis. One equine patient whinnied in expectation each morning for the fitting of his spectacles to correct seven dioptres of myopia. Dr. Foster referred to J. Ringland Anderson's standard of the aphakic eye of the dog, which was to be the counting of cats at one metre. Dangerous bulls had been fitted with safety masks to limit the field of vision, and fighting hens and roosters had worn pink glasses to diminish their propensities, since, when they were fitted, they could no longer enjoy the sight of blood. The hens at the Essex Penitentiary poultry farm were so equipped. Anatomical curiosities covered a long list and included reference to gentlemen who made an honest living by voluntarily protruding the eyeballs. There were smokers with large tear ducts who literally blew smoke out of their eyes, and one artist flourished who, with small hooks fitted to his lower lids, drew a small carriage weighing 300 pounds across the stage, walking backwards.

Dr. Foster went on to discuss the realm of things strange and unknown, including eyesight. He said that some incidents might be psychic phenomena, and fraud had often been detected. However, there were odd cases of the natural development of amazing physical coordination in blind athletes, notably boxers and wrestlers. Dr. Foster quoted the case of a blind patient who submitted to the removal of the eye under retro-bulbar anaesthesia while reading beneath the sheets a modern novel in braille. He said that Father Thurston, S.J., was an authority on many of those cases of extraretinal and apparently psychic vision. He quoted the case of a boy presented at a meeting in Los Angeles in 1936. The boy, aged eleven years, after

going into a trance, could read and see quite well despite the covering of his eyes with shields and multiple bandages. There was also the case of the man who could read with his nose after the eyes had been adequately covered.

Primary Glaucoma.

ALGERNON B. REESE (United States) read a paper entitled "Our Present Concept of Primary Glaucoma". He said that the fluorescein test and tonography had shown that primary glaucoma was not a problem of aqueous overproduction, but one of decreased facilities for aqueous outflow. The two types were (i) wide angle type (simple, chronic glaucoma) and (ii) narrow angle type (non-compensated, congestive or acute glaucoma). In wide angle glaucoma, in spite of an open angle the aqueous drained sluggishly from the anterior chamber owing to obstructions in the trabeculae, in Schlemm's canal or in the emissaries leading from Schlemm's canal. Sometimes the obstruction was due to the acquisition of a cuticle by the trabeculae. The obstruction might be more frequently in the emissaries leading from Schlemm's canal. It was probably correct to view wide angle glaucoma as essentially a vascular disease which led to the characteristic field changes, cupping of the optic disks and variations in the intraocular pressure. In narrow angle glaucoma the affected eyes had a shallow anterior chamber owing to an anteriorly placed iris-lens diaphragm, and the angle was a mere slit. The fluorescein test and tonography revealed a normal aqueous outflow except during elevation of the intraocular pressure, when the periphery of the iris was against the trabeculae. Repeated attacks caused peripheral anterior synechia with rising base pressure. The angle might be obliterated by anything which increased the bulk of the periphery of the iris—for example, dilatation of the pupil. If the aqueous pressure in the posterior chamber rose (perhaps from a neuro-vascular change in the venous capillary bed), the periphery of the iris advanced, with the production of a further narrowing of the angle leading to acute closure.

Dr. Reese said that treatment of wide angle glaucoma was unsatisfactory, as the disease tended to progress despite miotics or surgery. Iridencleisis was the operation of choice, but trephination was used in advanced cases with high base pressure. Miotics were more successful in narrow angle glaucoma, but were seldom satisfactory for permanent treatment. Surgical treatment was highly satisfactory and could be divided into the pre-synechia and post-synechia stage. An iridectomy cured glaucoma in the pre-synechia stage. It cleared some of the filtration angle (and possibly interrupted the axon reflex), but its success was due to the prevention of any rise in aqueous pressure in the posterior chamber. A small peripheral iridectomy was all that was necessary, and the operation should be performed in all cases whether or not the tension could be brought to normal with miotics. Peripheral iridectomy should be performed on both eyes regardless of the intraocular pressure. If peripheral anterior synechia had formed, a filtration operation was indicated (iridencleisis or trephine), according to the base pressure. The prognosis in wide angle glaucoma was guarded, owing to the tendency to relentless progress; but it was excellent in narrow angle glaucoma if adequate surgical treatment was given.

H. C. BECKETT (New South Wales) said that he wished to put forward three points in reference to the investigation and treatment of glaucoma. As a preliminary, he assumed that they were agreed that glaucoma was a serious condition and a common one; in England it was the greatest cause of blindness except cataract. Sorsby, in "Genetics in Ophthalmology", had stated that it was the cause of blindness in 15% of the 75,000 registered blind people in Great Britain. Dr. Beckett said that he supposed that the incidence in English-speaking countries would be much the same. Next, those present would probably agree that it was not possible to cure primary glaucoma, but they could modify its course. The commonest type of primary glaucoma was wide angle or chronic simple glaucoma, and the earlier it was detected, the more sight could be saved. That brought him to his

first point—the most practical way to sort out the odd unsuspected early case. It had been suggested that routine Schiötz reading should be undertaken. The disadvantages and shortcomings of that method were obvious; the reading would vary at different times of the day, and it was therefore a "hit or miss" procedure. Dr. Beckett went on to say that he had worked out a quick routine that added only two or three minutes to each examination. During the last twelve months five early cases had been found that would otherwise have been missed. The method consisted in a quick field of vision test with a two or three millimetres white test object above and below the blind spot. In his experience the earliest field of vision change in chronic simple glaucoma was a nerve fibre defect in the region of the blind spot, or early barring of the blind spot. The second point was the value of determining the phasic variation in each case of glaucoma. That dated provocative tests and gave considerable information about the degree of instability of the mechanism that controlled the intraocular pressure, the base pressure and the time or times of day during which the pressure rose. Therefore it would be known when miotics should be used during the day.

Turning to the less common narrow angle or congestive primary glaucoma, Dr. Beckett said that it was a bilateral condition in contradistinction to wide angle glaucoma, which might be unilateral or bilateral. It was a common custom to instil a miotic into the second eye at the end of an operation for congestive glaucoma, and to repeat the procedure at each dressing. In the light of the information obtained at the institute in Judd Street, London, which had been incorporated in the sixth Proctor Lecture by Sir Stewart Duke-Elder, Dr. Beckett wondered whether that was a wise procedure. He said that it had been shown that the neuro-muscular mechanism, or the mechanism of whatever nature, that controlled intraocular tension was weakened by the use of miotics, and such an eye was much more likely to develop an acute rise in tension than it would be if no miotic had been exhibited. Dr. Beckett said that he therefore reaffirmed Dr. Reese's suggestion that a peripheral iridectomy should be performed on the second eye before the patient left hospital.

ARTHUR D'OMBRAIN (New South Wales) said that as in wide angle glaucoma the angle was open, the obstruction must be posterior to it, either in the trabecular network or in the emissary veins. He pointed out that the gonioscope could not reveal the condition of the network or the degree of patency of the emissary veins, nor could the tonograph, which showed the facility of aqueous outflow to be below normal in wide angle glaucoma. Dr. D'Ombrain thought that a vascular block was unlikely, owing to the insidious and symptomless course of that type of glaucoma; his view was that some sort of sclerosing lesion in the trabecular network was the obstructive factor. He advocated accordingly a form of extrachambral decompression by careful trephining over the ciliary body so as to tap the aqueous at its source.

JOHN FOSTER (United Kingdom) asked whether Dr. Reese was quoting Amsler in stating that the fluorescein test showed chronic glaucoma to be due to a permanent obstruction of outflow and acute (narrow angle) glaucoma to be due to an intermittent obstruction. Amsler in correspondence had recently stated that his own interpretation was quite other—namely, that acute (narrow angle) glaucoma was largely a matter of hypersecretion and wide angle glaucoma showed slight hypersecretion. In some cases of narrow angle glaucoma he had found that the fluorescein disappeared more rapidly than from normal eyes. Dr. Foster mentioned Professor Goldmann's work in that connexion, and asked whether it was his opinion that was being quoted.

R. F. LOWE (Victoria) said he realized that Dr. Reese had not described the importance of diurnal tension variations owing to lack of time. He wished to confirm the necessity for their recording for the control of glaucoma in many patients. For example, one patient with suspected glaucoma had a tension of 40 at 6 a.m., but by 8 a.m. the tension had fallen to 28, and it remained normal for the

remainder of the day. Those observations necessitated admission to hospital with resident medical officers to carry out the tonometry. That case illustrated the dangerous conclusions that might be drawn by taking the tension throughout the day in one's consultation rooms and missing the crucial observation.

Dr. Lowe went on to say that the observation that many patients with glaucoma had an abnormality in secretion of aqueous seemed substantiated by the observations that high intraocular tensions might be reduced in a matter of minutes after the injection of hexamethonium bromide (a ganglionic blocking agent). The dose used was one or two milligrammes per kilogram of body weight. Such drugs appeared to have a definite role in the treatment of acute glaucoma. Just before operation the intraocular tension might be lowered to permit operation on an eye, with greatly reduced operative risk. For the early days after operation, when tension might remain high, the tension might be controlled until the eye grew quiet. Similarly in acute secondary glaucoma the tension might be controlled during the danger period. The effect of one injection lasted a variable period, usually several hours, when the injection might be repeated. The treatment was thought to be of little value in chronic glaucoma because the tension tended to rise under treatment and side-reactions were unpleasant—for example, circulatory hypotension and loss of accommodation for near vision. Unfavourable general reactions following an injection of methonium compounds might be relieved by an injection of noradrenaline.

JAMES B. ACCOLA (East Maitland, New South Wales) asked what place, if any, cyclodiathermy had in the treatment of glaucoma.

The Ridley Lenticulus Operation.

JOHN FOSTER (United Kingdom) read a paper on the Ridley lenticulus operation.

KEVIN O'DAY (Victoria) said that he had examined a section of the eye referred to by Dr. Foster. He had not seen anything which he had not seen in eyes lost after extracapsular extraction without the insertion of a lenticulus. The changes in the iris and filtration angle were those usually seen in a heavily pigmented iris with inflammation. The giant cell formation in the membrane anterior to the lens capsule he had indeed seen in an inflamed eye which had not been subjected to operation.

S. R. GERSTMAN (Victoria) asked Dr. Foster two questions: (i) whether the lens had been used in the case of congenital cataracts; (ii) whether, if the capsule thickened up, it was possible to carry out some form of capsulotomy.

J. RINGLAND ANDERSON (Victoria) asked two questions: (i) whether the presence of a fluid or very degenerative vitreous should be considered a contraindication; (ii) whether it was very difficult to remove a misplaced lenticulus, as shown by an incomplete iris shadow, and if so, whether Dr. Foster had any special tips for doing so if the anterior chamber had to be rewashed.

Dr. Foster, in reply to Dr. Ringland Anderson, said that the procedure was not used in the presence of a degenerate vitreous or high myopia. In reply to Dr. Anderson's second question, Dr. Foster said that in the circumstances mentioned the lenticulus was removed under pressure with a lens extractor. He had never tried it himself in congenital cataract, as the results were usually poor.

The Büdinger-Müller Lid Plastic Operation.

JOHN FOSTER (United Kingdom) read a paper entitled "The Büdinger-Müller Lid Plastic Operation". He said that in repair of the eyelids following congenital defects or extensive lesions sliding skin flaps were not suitable. The loss of tarsus gave an immobile, shapeless lid subject to ectropion or entropion. Two other methods were available: (a) "halving", when the opposite lid was intact; (b) the method of aural chondro-dermic grafting (associated with the names of Büdinger and Müller). In 1902 Büdinger had described replacement of the outer third of the lower

lid by a temporal pedicle flap, to the inner side of which he sewed a curved piece of cartilage and skin taken from the scaphoid fossa. He thus replaced conjunctiva and tarsus with aural tissue. Müller's operation took the procedure a stage further by replacing all three layers at once, a section of the *crus helictis* of the ear with skin being removed on both sides. The aural deformity was slight, and was noticed only on careful examination at right angles. A little graft shrinkage occurred, so that it should be made two millimetres too broad and one millimetre too thick. Keratitis might be expected from its use for upper lids, but in practice serious corneal trouble appeared to be rare. Dr. Foster gave reports of 12 cases and showed photographs.

ARTHUR D'OMBRAIN (New South Wales) asked what part of the ear was affected.

Dr. Foster said that the part affected was the *crus helictis*. The operation caused some deformity of the ear.

H. J. TAYLOR (Queensland) asked whether the flap was the whole thickness of the ear.

Dr. Foster said that the flap consisted of the ear and the skin from behind the ear.

The Eye of the Monotreme.

KEVIN O'DAY (Victoria) read a paper entitled "Observations on the Eye of the Monotreme". He pointed out that the platypus and the echidna were the only known living members of the family of egg-laying mammals (monotremes) and were confined to Australia and New Guinea. The eyes of the two animals differed from those of the other mammals. Features common to both were the cartilaginous sclera, the absence of a ciliary muscle, the rudimentary lens pad and the retina, which in its general structure had closer affinities with that of the fishes, amphibians, reptiles and birds than it had with the retina of other mammals. Unique features of the echidna's eye were the keratinized corneal epithelium and the flat lens. No cones were present in its retina, whilst the platypus possessed both rods and cones, the latter being both single and double, both varieties containing oil droplets.

IDA MANN (Western Australia) congratulated Dr. O'Day on his important work in describing the curious vertebrates of Australia. She said that he was continuing for the country the work of Rochon-Duvigneaud and Gordon Walls, and it was to be hoped that he would one day publish a book on the eyes of indigenous Australian vertebrates. The primitive characters of these eyes were interesting when one considered the highly evolved fundus of the most primitive lizard, the *Sphenodon* of New Zealand. That animal had a macula, a papillo-macular bundle and arcuate fibres of similar arrangement to those of man. The nerve fibres of the echidna and platypus must have a purely radical arrangement. Professor Mann asked two questions: first, what were the appearances of the fundi during life, and second, whether there was any tapetal reflex. She also asked what was the colour of the iris in life.

ARTHUR D'OMBRAIN (New South Wales) asked about the drainage system—whether there was a reticular system for the outflow of the intraocular fluid. He also asked whether Dr. O'Day had formed any opinion as to the system of drainage in the four or five related species under discussion.

T. A. B. TRAVERS (Victoria) asked whether the echidna accommodated at all, and whether it was necessary for such an animal to accommodate.

J. RINGLAND ANDERSON (Victoria) stated that the Society was very fortunate in having a member with the skill and enthusiasm of Dr. O'Day. He wished to ask one question. The macroscopic view of the echidna's eye revealed an organ with dimensions very similar to a human eye. The flattened lens and the small pad suggested that it was subjected to the pull of a ciliary muscle. In addition, one's observation of the animal feeding suggested that accommodation would be required. Dr. Ringland Anderson wondered whether Dr. O'Day had any views concerning the

animal's method of accommodation in the absence of all ciliary muscle. He also wondered whether it had very weak accommodation and an optical system set for the short distance from it of its food, and whether it relied on information of approaching distant objects through the sensitive set of bristles arising from its skin receiving vibrations.

Dr. O'Day, in reply to Professor Mann, said that the fundus of the echidna was a slaty-brown colour. The reflex did not suggest the presence of a tapetum. The iris was a dark brown and no vessels were visible. In reply to Dr. D'Ombraïn, he had observed that the fine reticular tissue of the uveal tract insinuated itself into the limbal region with the suggestion of a structure resembling that of the filtration angle of the human eye. In reply to Dr. Travers, Dr. O'Day said that he could find no evidence of an accommodative mechanism. Troughton was of the opinion that the animal fed at night. Under those conditions it would have to rely on some other sense.

The Blood Supply of the Optic Nerve.

JOHN L. BIGNELL (Victoria) read a paper entitled "Investigations into the Blood Supply of the Optic Nerve with Special Reference to the Optic Papilla". He said that the blood supply to the orbital portion of the optic nerve had been investigated, particularly by Wolff (1939) and Vail (1948), and it was agreed that there was wide variation in the primary source, whether from the internal carotid artery through the ophthalmic artery, or by anastomosis of branches of the ophthalmic artery with the orbital structures associated with the external carotid field. That was shown clinically by cases of occlusion of the internal carotid artery on one side, some patients going blind in the eye on the same side, others suffering no visual changes. It had been denied that the central retinal artery supplied any part of the optic nerve from the site of entry of the vessel through the dural sheath of the optic nerve up to the papilla itself.

Dr. Bignell said that the investigation had included dissections of orbital contents after injection of the internal carotid artery with Indian ink, and the inspection of numerous longitudinal sections and cross-sections of the nerve at varying levels. It was concluded that the central retinal artery did in fact supply the optic nerve immediately behind the *lamina cribrosa*, and that it anastomosed with branches from the posterior ciliary arteries which crossed from the sclera to the optic nerve at the level of the *lamina cribrosa*. A consideration of the pathology of the small arterioles might lead to a greater understanding of many obscure cases of "retrobulbar neuritis" and hæmorrhages about the optic disk.

ARTHUR D'OMBRAÏN (New South Wales) asked what light the vascular arrangement in and around the optic nerve threw upon lesions.

ALGERNON B. REESE (United States) said that Dr. Bignell had given a beautiful demonstration. They knew the clinical sequelæ of occlusion of the central retinal artery; they would like to know the effect of occlusion of the post-ciliary arteries. Vascular disease of those arteries would probably not affect the fundus on account of the rich anastomosis. It was known that in glioma of the nerve there were frequent changes in the retina if the neoplasm was anterior to the entry of the vessels; but if it was posterior to the entry of the vessels to the nerve there was no pigmentary change in the retina.

T. A'B. TRAVERS (Victoria) asked where the occlusion was likely to take place in embolism of the central retinal artery. Was it likely to take place behind the anastomosis around the papilla?

The Advantages of General Anæsthesia in Ophthalmology.

T. A'B. TRAVERS (Victoria) discussed the advantages of general anæsthesia in ophthalmology. He said that local anæsthesia had long been considered an essential for intraocular surgery, but with the great advances in modern anæsthetic drugs it was no longer necessary to depend on

local anæsthesia. The surgeon required an anæsthetic that was safe, would be relatively free from post-anæsthetic vomiting, and would relax the patient completely. With general anæsthesia it was essential to use curare or some other relaxant, as that gave far greater relaxation than the anæsthetic alone. Dr. Travers said that in the past eighteen months general anæsthesia had been used as a routine in all eye operations at the Royal Melbourne Hospital. The techniques to be described in the papers by Dr. Housman and Dr. Galbally had been found to be safe and relatively easy. They required a competent anæsthetist who was familiar with eye work. Dr. Travers suggested that, those conditions being obtainable, general anæsthesia was preferable to local anæsthesia for intraocular surgery.

GORDON HOUSMAN (Victoria) said that the age group of those requiring intraocular surgical procedures was generally high and the patients were habitually frail. In addition to their eye complaint they often suffered from arteriosclerosis, hypertension or diabetes. They did not tolerate well either anoxia or severe circulatory disturbance. Anæsthesia for such subjects should be smooth and should produce a reduction of intraocular tension by relaxation of the eye muscles. There must be no straining on the part of the patient, either during operation from inadequate anæsthesia or post-operatively from vomiting. Two anæsthetic techniques had been used. With both techniques "Flaxedil", a synthetic curarizing agent, was employed to obtain relaxation of the eye muscles, while the plane of anæsthesia was still light. Pethidine and atropine were given pre-operatively. Occasionally hyoscine was used. With one technique anæsthesia was induced with "Pentothal" and maintained by the endotracheal administration of nitrous oxide, by cyclopropane or by "Trilene". "Flaxedil" was given to aid intubation and to relax the eye muscles. Topical anæsthetics were used liberally to subdue laryngeal irritability from the presence of the endotracheal tube. With the second technique anæsthesia was with "Pentothal" alone. "Flaxedil", sufficient only to relax the eye muscles without affecting the muscles of respiration, was mixed with the "Pentothal". No endotracheal tube was used. Oxygen was administered orally throughout. Manual support of the patient's chin by the anæsthetist during the operation was considered important for maintaining a clear airway and keeping a check on the depth of anæsthesia. The latter technique was preferred on account of its simplicity and the quietness of recovery from anæsthesia.

KATHLEEN GALBALLY (Victoria) discussed the various agents used in general anæsthesia for ophthalmology, and mentioned the different methods of using them in different countries. Referring first to premedication, Dr. Galbally said that it was essential that a parasympathetic depressant such as atropine or scopolamine should be given to diminish the secretion of mucus, so that respiratory obstruction and post-operative respiratory complications might be reduced to a minimum. Morphine, in addition to relieving the apprehension and reducing the metabolic rate, reduced the quantity of anæsthetic needed for narcosis. Pethidine ("Demerol") was useful if morphine was not tolerated or if its use was contraindicated; it did not appear to cause less vomiting. "Omnopon" was useful for patients who were said to be allergic to either morphine or pethidine, and it rarely caused vomiting. Dr. Galbally then discussed the agents used during the operation. She mentioned first the non-volatile anæsthetics. The first group of those considered was that comprising the barbiturates—thiopentone sodium ("Pentothal Sodium") and pentobarbital ("Nembutal"). Dr. Galbally described the advantages and disadvantages of each. Turning to the relaxants, she said that as adjuvants to anæsthesia with thiopentone they had been of inestimable value; a lighter plane of anæsthesia could be used, the danger of laryngeal spasm was minimized, and there were excellent relaxation and a further reduction of intraocular pressure. Only the relaxants with a true curarizing action, such as curare and "Flaxedil", were of use in ophthalmic work. Dr. Galbally went on to describe the mode of action of those two agents, and showed how physostigmine and neostigmine were safe antidotes to them. One of the methonium compounds, hexamethonium

iodide had recently been tried, but it was of little assistance in general ophthalmic work. Dr. Galbally finally said that the use of "Pentothal" and curare had been found to be pleasant for both patient and surgeon; but it was absolutely essential that the operation should be of short duration and that anaesthesia should be in the hands of a skilled anaesthetist who knew not only the surgeon but the steps of the operation.

R. G. LINTON (Western Australia) requested the speakers to outline the post-operative routine. He also asked what action should be taken in prolonged apnoea when a pharyngeal tube only was in use.

JOHN FOSTER (United Kingdom) said that, unlike the English-speaking peoples, the Spanish actually preferred local anaesthesia—"No me gusta el cloroformo, prefiero el resistoform!" ("No chloroform for me, I'll take resistoform!") expressed their feelings. In France and in England general anaesthesia for intraocular operations was becoming more popular, though some surgeons, including himself, had had unfortunate experiences with reflex action or great fall in tension. While agreeing that in theory it was ideal, in view of his own experiences, admittedly without curare, he would like Dr. Travers to give statistics of post-operative complications before and after the introduction of general anaesthesia for cataract extractions.

IDA MANN (Western Australia) said that she was glad that the subject had come up for discussion. She had begun experiments with Professor Macintosh, of the anaesthetics department at Oxford, in 1941, and after many trials they had arrived at a satisfactory method which she believed was still in routine use at Oxford. They used an oro-pharyngeal airway and injected "Pentothal" into the arm vein. They did not use "Flaxedil", but continued with cocaine in the conjunctival sac, since they thought that local anaesthesia decreased the amount of "Pentothal" required. Professor Mann said that since coming to Perth she had continued to use that method and had had excellent results. She gave the patient the choice of local or general anaesthesia.

ARTHUR D'OMBRAIN (New South Wales) said that they had come near to perfection, except for the imponderable factor, the patient himself. He asked how it could be decided that a patient was suitable, and who decided it.

EUNICE WILSON (New South Wales) asked what advice could be given about the allaying of terror in a child, aged three or four years, as it was often hard to examine him after he had had an anaesthetic. She also asked what anaesthesia was advised for a child with a perforating injury.

A. N. SLATER (New Zealand) asked whether the mixture of "Pentothal" and relaxant was varied according to the patient's needs.

A. L. LANCE (New South Wales) asked whether the patient became more frightened when he found that he was in darkness, owing to the fact that the bandage was put on when he was unconscious.

Melanosis of the Conjunctiva.

A. B. REESE (United States of America) read a paper on the subject of melanosis of the conjunctiva. He said that children were often brought for advice because a conjunctival naevus was so conspicuous against the white sclera. Malignant growths from such lesions were extremely rare. The naevus was usually at the limbus in the palpebral aperture and was variably pigmented, but approximately 30% had no recognizable pigment and were of a salmon colour. The melanin might increase rapidly, especially at puberty, and a previously inconspicuous lesion might appear to grow quickly. Malignant growth was shown especially by increase in the nutrient vessels. All naevi should be excised. The procedure was simple and entailed no hazards, so that fears were allayed and the risk of malignant change was avoided. Exenteration was essential for malignant naevi, and half-measures such as local excision or enucleation increased mortality. Dr. Reese went on to say that melanosis might be congenital

or acquired. Congenital melanosis might be within or beneath the conjunctiva. Stromal (subconjunctival) melanosis appeared light brown to bluish-grey. With the slit-lamp, spider-shaped stromal melanoblasts could be resolved. The pigment was characteristically more pronounced around the emissaries of the anterior ciliary arteries. The stromal pigmentation was seen almost invariably in subjects who had an accentuation of pigment elsewhere over the body. The incidence was approximately 12%. That pigmentation never led to malignant growth. Conjunctival melanosis was located in the basal layer of the epithelium, and appeared as a mottled area near the limbus. Its incidence was approximately 12%, but it was not particularly associated with increase of pigment elsewhere. Clear striae sometimes coursed through the area, especially when the site was at the upper or lower part of the limbus. It usually did not attract attention, and so the possibility of malignancy was difficult to determine.

Dr. Reese then said that acquired melanosis was usually noted in adult life around middle age. The behaviour of that precancerous melanosis was most unusual and unpredictable. The lesions tended to increase in size over one to ten years and then changed to cancerous melanosis. In precancerous melanosis the lesion was non-elevated and irregular in shape, and might appear mottled owing to varying density of pigment. The lustre of the epithelium was disturbed and a black stippling was seen. There might be periods of regression and progression. The precancerous lesion usually progressed gradually and appeared at multiple sites over the bulbar and palpebral conjunctiva, to be transformed insidiously into cancerous melanosis—a malignant tumour with a high mortality rate. Elevation was unusual even in the malignant phase, so that the lesion might be considered innocuous by the ophthalmologist. The metamorphosis was often so gradual that clinically and histologically distinction was difficult. Uncertainty existed concerning treatment of precancerous melanosis. The lesion regressed under irradiation, and that might be adequate, but in other cases it became cancerous and needed exenteration. Malignant melanoma arising from precancerous melanosis was approximately fifteen times more common than malignant melanoma arising from a naevus. The mortality from both types was extremely high.

KEVIN O'DAY (Victoria) demonstrated pictures of sections from the case referred to by Dr. Boyd Law, in which the iris, trabecular spaces, iris processes and choroid were heavily pigmented. The retina was completely detached with evidence of localized vascular occlusion and cystic degeneration. No tumour was found in the sections examined, and the absence of an albuminous subretinal exudate indicated that its presence was unlikely.

Trends in Cataract Surgery.

A. B. REESE (United States of America) read a paper entitled "Trends in Cataract Surgery". He said that minutiae were important in cataract surgery. Local anaesthesia including retrobulbar injection was used. The patient should be heavily sedated. "Nembutal" (0.2 gramme) was given two hours before operation, and a second dose of 0.1 gramme was given one hour later. Pethidine, 0.075 gramme, was injected forty-five minutes before operation and the dose was repeated in the operating theatre if the patient was not sufficiently quiet. "Pentothal" sometimes produced muscle spasm and was not desirable for routine use. An air tube under the drapes increased comfort and relaxation. A scissors section was preferred, because the slight crushing stimulated repair. The blades of capsule forceps must be absolutely parallel. Round pupil extractions were usual, and if the pupil was small it must be dilated slowly with passage of the lens. Eversion of the conjunctival edges minimized the chance that epithelium might grow into the anterior chamber. Sutures were removed on the fourteenth day after cocaine drops had been instilled and a little solid cocaine had been applied to the suture area. If the iris prolapsed with escaping aqueous as the wound opened about the sixth day, it must be excised promptly, otherwise

the prolapse would progress. Slight insidious iris prolapse due to herniation of the hyaloid into the wound required no excision. If iris excision was required, the decision must be made and acted upon promptly. Herniation of the hyaloid membrane through the pupil so that it touched the cornea usually corrected itself. If the hyaloid membrane remained in contact with the cornea for two weeks, measures should be taken to prevent secondary glaucoma and bullous keratitis. Vitreous pressure should be lowered by posterior sclerotomy and air injected into the anterior chamber through a small bevelled incision at the periphery. A similar procedure should be adopted if an eye showed undue post-operative reaction after loss of normal thick vitreous. After loss of fluid vitreous, convalescence was usually uneventful.

Dacryocystorhinostomy.

T. BOYD LAW (Lismore, New South Wales) discussed the subject of dacryocystorhinostomy, not with the object

of presenting a new technique, but rather with the object of modifying some of the already existing techniques in such a way as to simplify the procedure and to make it attractive and really the operation of choice, in many of the cases of dacryocystitis formerly dealt with by sac excision. He said that local anaesthesia was the anaesthesia of choice, and laid stress on careful technique in that regard and in the premedication of the patient, so as to make the procedure a painless one for the patient and a less irksome one for the surgeon. The method of suturing the flaps from the tear sac and the mucous membrane of the nose was described. Dr. Law said that a needle that could be used in the cramped space had been evolved, and it was considered to be an improvement on those already in existence. Dr. Law finally dealt with complications likely to be encountered with post-operative care, and with the results of treatment in 42 cases during the past few years. He showed coloured slides of photographs taken in the operating theatre to illustrate various steps of the procedure.

Section of Orthopaedics and Physical Medicine.¹

President: J. W. van R. Hoets, M.B., Ch.M., F.R.A.C.S., New South Wales.

Vice-Presidents: John Colquhoun, M.B., Ch.B., F.R.C.S.E., Victoria; N. P. Wilson, M.B., B.S., F.R.C.S.E., South Australia; T. Hogg, M.B., B.S., F.R.C.S.E., Tasmania.

Honorary Secretary: J. J. Woodward, M.B., B.S., F.R.C.S., F.R.A.C.S., Victoria.

President's Address.

J. W. VAN R. HOETS (New South Wales) devoted his president's address to consideration of certain medico-legal aspects of the orthopaedic surgeon's work. He said that a patient might claim damages from his medical attendant for negligence—not for unskilful treatment or a bad result, provided the surgeon had not neglected to take all those steps in treatment which from his training and experience he should have taken. The surgeon might not be a very skilful operator or manipulator, and might fail to get certain results which a more skilful man would obtain, but that was not his fault, provided that under the circumstances he had not neglected to do everything which he should know should be done. Dr. Hoets quoted five examples to illustrate the various situations in which any surgeon might be placed. The first was that of a doctor who failed to have an X-ray examination made of an injured ankle and so failed to diagnose a fracture present. In that case there was no doubt that the surgeon was guilty of negligence. The second was that of the surgeon who performed the wrong operation on a patient because his staff had altered the order of an operation list. The surgeon was personally not negligent at the time of operation, but could not escape responsibility for the system which allowed of such a mistake and under which he worked without protest. He was responsible for the negligence although it was not his own. In the third example, the surgeon advised spinal anaesthesia and undertook to engage a specialist anaesthetist. Through a fault in the glass, spirit entered the ampoule and was injected into the dural sac, causing paraplegia. In that case, although the surgeon had taken every care in the interest of the patient, it could be said that he was responsible for the accident, because he himself had undertaken to engage the anaesthetist. The point was an interesting and important one, although the implications of the situation could vary considerably with different circumstances. Dr. Hoets commented that in the three examples he had given the cases were unlikely ever to go to court. Both parties knew that in the first two cases a verdict for damages would be inevitable, and in the third case the legal battle would be so intense and the result so uncertain that the matter was better settled out of court. In the fourth example a

subcapital fracture of the femoral neck was reduced and fixed with a Smith-Petersen nail. Septic necrosis occurred and the result was a failure. A claim for negligence was heard before a jury. Much evidence of a highly technical nature was given in defence, and none for the plaintiff which was not completely nullified in cross-examination. Counsel for the plaintiff made a clever appeal to the jury. The judge's summing-up was a fair, impartial review of the evidence, but the jury found for the plaintiff. The fifth example was the Bell-Hocking case, in which extraordinary medical evidence was given and the jury found for the plaintiff. Dr. Hoets pointed out that however intelligent and careful the individual members of the lay jury might be, the weighing of expert evidence was an almost impossible task for them. Examination and cross-examination of expert witnesses left them in a state of confusion. The production in court of exhibits such as X-ray films and anatomical specimens could create a farcical situation. Dr. Hoets went on to say that in many parts of the British Commonwealth such cases were heard not before a lay jury but before a judge or bench of judges. Such men, although not medically trained, were trained in the sifting of evidence. A counsel could not hope to bring victory to his side by confusing a nervous witness or making emotional appeals. An expert witness had to be expert in the particular branch of surgery under consideration if his evidence was to carry weight. It would seem that the only relief to be hoped for from the dangers of unjustified actions of negligence would come from an alteration in the law to abolish the practice of actions for damages against medical men being heard before lay juries. Dr. Hoets suggested that perhaps some members of the Section present could point out how that might be brought about.

B. T. KEON-COHEN (Victoria) said that the President had been discussing a contentious matter on which all were exercised—the absurd verdicts sometimes given by juries. He said that two years previously a man had been awarded £5750 damages for a compound fracture of the right leg and had since won a full "blue" in tennis. The statement had been made that if the accident had not occurred the man might have played full-forward for Melbourne. Two insurance companies had been involved, but both had been unwilling to appeal in case the final verdict was even less satisfactory. Dr. Keon-Cohen said that he came from a legal family, but it seemed wrong to him that gross dis-

¹ The meeting held by the Section of Orthopaedics and Physical Medicine with the Section of Radiology and Radiotherapy has been recorded.

crepancies should result from the skill with which individual counsel could sway a jury. He suggested that the section should recommend to the Federal Council that an approach be made to the appropriate Government authority to have the situation rectified. He moved the following motion:

That the Federal Council be approached to consider recommendations that existing laws be altered where necessary to provide that actions for damages against medical practitioners for allegations of negligence be decided by a judge and not by a jury.

A. L. DAWKINS (Western Australia), who seconded the motion, said that he was fortunate enough to practise in an enlightened State, where cases for damages were heard before a judge and not before a jury. No action had been taken against a doctor of recent years, to his knowledge, and had reached a court in Western Australia, probably because of the fact that juries were not involved. There were actions, but they were mostly settled out of court. He said that apart from the question of the ability of juries to determine liability, it seemed fatuous that they could assess disability in terms of money. It was unsatisfactory that no reasonable standard existed. That question was difficult enough for judges, but at least each individual judge was more or less consistent. He considered that cases for damages should be heard and assessed by a judge.

H. D. O'BRIEN (Tasmania) said that some years previously he had been visiting hospitals in Pittsburgh, where many accidents occurred, and found that practically 100% of fractures of the lower extremity were plated. When he inquired the reason for this he found that although a small amount of sepsis occurred, as well as an average delay in union of seven to ten days, plating was favoured because a certain class of lawyers and of doctors in the city would take up the case of people with unimportant symptoms following treatment for fracture, and because slightly faulty alignment or slight shortening of the fractured bone seen in X-ray films would convince a referee that a major degree of displacement was present. The only way out of the situation seemed to be to ask the patient to sign a form beforehand absolving the doctor from responsibility for the result. Dr. O'Brien agreed that it was right that negligent doctors should be sued, but the signing of the form seemed the only way out of a dilemma.

J. J. WOODWARD (Victoria) said that sometimes so-called expert witnesses were only people who had read a number of books. Books by eminent authorities could be quoted out of context, or be out of date and could mislead juries. He wondered if some method or rule could be evolved on the subject of expert witnesses. Such people should have some real claim to be experts, and Dr. Woodward wondered if an accredited list could be drawn up by some responsible medical body.

E. E. PRICE (Victoria) said that a number of other issues had been raised in the discussion, and he wondered if the original motion should be amended to ask the Federal Council to study all the implications of the question.

J. R. BARBOUR (South Australia) referred to the present state of medical defence organizations. In some States they were out of date in such matters as the extent of claims. Claims were becoming extremely high; for example, a judge in Adelaide had awarded £575 for malunion of one rib. Dr. Barbour wondered if the British Medical Association could look into the question of medical defence organizations.

Dr. Keon-Cohen's motion was put to the meeting and carried.

Common Disorders of the Cervical Part of the Spine.

J. R. BARBOUR (South Australia), in a paper on common disorders of the cervical part of the spine, said that if fractures, dislocations and bone infections were excluded, the common disorders fell into four groups: (i) disk herniation with acute symptoms; (ii) "herniation" of slow

onset; (iii) late results of disk injury; (iv) abnormal structure of the thoracic inlet. By the use of radiography and electromyography it was possible to define the cases of each group, and the remainder bore a diagnosis which was a matter of conjecture. Acute herniation was straightforward in presentation, and the level of injury could be determined clinically by the distribution of pain over the shoulder, arm and hand, and by muscular affection. The more chronic disorders frequently produced few or no neck symptoms; the radiating pains, headaches and subsequent debility masked the true basis of the condition. In abnormalities of the thoracic inlet a cervical rib usually needed to project as far as the *scalenus medius* muscle before it was indicted. High dorsal scoliosis and postural defects of the shoulder girdle might make a normal first rib act as did a cervical rib. Falciform extensions of the scalene insertions onto the first rib could produce symptoms, but clinically were difficult to differentiate. Treatment was mainly conservative. Few disk lesions did not respond to traction and splinting. Many patients with thoracic inlet syndromes could be relieved by postural exercises, adjustment of sleeping position and similar measures. In the latter group speculation or exploratory operation gave a few excellent but mainly disappointing results and should be avoided if the diagnosis was not clear.

B. T. KEON-COHEN (Victoria) asked if the speaker regarded every case of narrow disk space as a result of a disk hernia.

N. P. WILSON (South Australia) asked why with onset of the shoulder syndrome the cervical syndrome should settle down, as had been common in his experience.

FRANK MAY (Victoria) asked about the general indications for operation, and in particular whether residual wasting of muscles should be treated by laminectomy.

A. L. DAWKINS (Western Australia) referred to the medico-legal aspects and commented that it was difficult to determine if symptoms were entirely organic.

A. J. TRINCA (Victoria) asked what could be done to halt the course of symptoms once evidence of disk hernia had begun. He also raised the question of whether the benefits from physiotherapy might result from stretching and so elongating the nerve trunk.

E. E. PRICE (Victoria) mentioned that in his experience symptoms of recent origin frequently did not correspond to the level of the old degenerate disks shown in the X-ray pictures. He thought that acute symptoms were more likely to arise in relation to a disk which had hitherto been undamaged.

Dr. Barbour, in reply, said that not all narrowed disks were the result of trauma; some were undoubtedly developmental. He felt that it was not always possible to halt the progress of a disk lesion, and quoted one case in which progress had occurred while the patient was in bed. He said that operation was avoided if possible, as it was hazardous. It should be reserved for patients having sufficient pain; muscle wasting alone was not enough justification. He doubted if physiotherapy alone actually lengthened a nerve. A degenerate disk was not infrequently associated with a large acute hernia.

Osteoarthritis of the Hip Joint and Hip Arthroplasty.

FRANKLYN STONHAM (Melbourne) read a paper entitled "Osteoarthritis of the Hip Joint". He said that osteoarthritis was a degenerative process, and discussed it under the following four clinical types. (i) Osteoarthritis might follow paediatric disorders of the hip, such as congenital dislocation, congenital *coxa vara*, *osteochondritis juvenilis* and slipped epiphysis. (ii) Osteoarthritic changes might follow trauma, such as dislocation of the hip or fractures of the acetabulum or the upper end of the femur, especially if there was some degree of malunion. (iii) Osteoarthritis of the hip as an isolated joint lesion was fairly common; it might occur in healthy young adults, but was more common in old age. (iv) The condition might occur as a manifestation of generalized osteoarthritis. Discussing the morbid anatomy, Dr. Stonham said that the cause was unknown. Trauma had been blamed. However,

local avascularity was without doubt the common denominator in all types. An obscure aetiological factor interfered with the nutrition of the articular cartilage and it was unable to withstand ordinary wear and tear. Dr. Stonham described in detail the changes that occurred in the cartilage, the bone and the other structures involved. He said that the general tendency was to flattening and "mush-rooming" of the femoral head and to *coxa vara*, with corresponding distortion of the acetabulum. The joint capsule hypertrophied, and the resultant thickening and loss of elasticity limited movement and in some cases locked the joint completely. Bony ankylosis did not occur. Synovial fluid might be absent or scanty; but effusions of clear yellow or cloudy fluid containing debris and fat were not uncommon. The muscles operating the hip atrophied from disuse. Referring to the clinical features, Dr. Stonham said that the main symptoms were pain, stiffness, a stiff hip, a short leg and a limp. The pain was usually a dull ache accompanied by stiffness, and it was relieved by activity. It might be aggravated by exposure to cold and during cold weather, and be subject to periodical variations. The movements limited were rotation, abduction, adduction, flexion and extension in that order. If a condition of long-standing virtual ankylosis had been present, the hip muscles might be atrophic. X-ray examination revealed a narrow joint space, sclerotic margins, lipping, and possibly a certain amount of atrophy of the adjacent bone. Other suspected joints should be radiologically examined also. Discussing treatment, Dr. Stonham said that since no conservative measures had any effect on the course of the disease, and the symptomatic relief afforded by it was only temporary, it was contraindicated for all patients who were otherwise fit to undergo operation and had an expectation of life of more than five years. Operative treatment had so much more to offer that it should be undertaken early. Dr. Stonham discussed the three forms of operative treatment—osteotomy, arthrodesis and arthroplasty—and advocated arthroplasty as the method of choice. He gave the following as his reasons. (i) Arthroplasty left the patient with a painless, movable joint. (ii) The operation was only slightly more severe than osteotomy or arthrodesis, and the period of convalescence was short. (iii) It was applicable to most cases, and its success depended largely upon post-operative physiotherapy. However, arthroplasty should not be undertaken if the hip muscles were atrophic, or if the patient was too frail or psychologically ill-adapted to cooperate in the after-treatment.

DENIS P. ROWE (New South Wales) discussed hip arthroplasty. He said that he would not discuss the merits or demerits of other surgical procedures used in the treatment of osteoarthritis of the hip joint, although anyone undertaking hip joint surgery must have the full armamentarium at his disposal and be prepared to treat each case on its own merits. Hip arthroplasty, with the interposition of perishable materials, had been carried out for the last forty years with many satisfactory results. However, with the work of Smith-Petersen using a vitallium mould, and the more recent work of the Judet brothers, of Paris, using an acrylic prosthesis, a new era had been reached in the surgery of the hip joint. With the advent of antibiotics and the more frequent use of blood transfusion, the operation of hip arthroplasty had become more popular. After referring to past difficulties and lack of success in hip arthroplasty operations, Dr. Rowe went on to explain in detail the Smith-Petersen cup arthroplasty, which he described as a major operation entailing reshaping of the acetabulum and the head of the femur, plus the interposition of a vitallium cup. He then gave details of the Judet type of arthroplasty, which he had been performing for the past twelve months in selected cases. He said that when the acetabulum was shallow, as in *malum coxae senilis*, he had been disappointed in the results of the Judet type of operation. For that type of case and for osteoarthritis of old congenitally displaced hip joints, the operation of choice was the Smith-Petersen cup arthroplasty. For ununited fracture of the femoral neck and osteoarthritis of the hip joint in which there remained a good deep acetabulum, the Judet type of operation was prefer-

able. Dr. Rowe said that the poor results reported in recently published figures by the Judet brothers appeared to be due to poor selection of patients. The patients for whom results were poor would probably have done better with cup arthroplasty. Dr. Rowe said that he had been performing the Judet operation almost routinely for subcapital fractures of the neck of the femur and had been very pleased with the results. For the bilateral fused hip joints of ankylosing spondylitis he had yet to see a good result with either type of operation. In those cases excision of the neck and head of the femur with trimming of the acetabulum rim gave better results. In summary, he said that the Judet type of arthroplasty was excellent for osteoarthritis of the hip joint without acetabular deformity, for subcapital fracture of the femoral neck, and for old ununited fracture of the femoral neck. For *malum coxae senilis* and osteoarthritis associated with old congenital dislocation of the hip, hip arthroplasty was indicated. For bilateral fused hips of ankylosing spondylitis the modified type of operation devised by Batchelor was preferred.

A. J. TRINCA (Victoria) discussed the possible origin of arthritis, especially as arising from collagenous disease of the *vasa vasorum* of bone.

J. B. COLQUHOUN (Victoria) said that in America many modifications of the Judet operation had already been devised. Smith-Petersen, however, had not modified his technique, but rather the materials of his interposed prosthesis. There had undoubtedly been definite and valuable advances in the treatment of osteoarthritis, but all methods were still likely to have indifferent results.

J. J. WOODWARD (Victoria) said that the results of vitallium cup arthroplasty were so uncertain that operation should not be carried out unless pain forced the issue. He referred to difficulty in getting sufficient internal rotation to facilitate using the Judet auger.

Dr. Stonham, in reply, said that the results of cup arthroplasty were not uncertain. He referred to one bad result which he thought was influenced by medico-legal considerations. He said that this operation was carried out late, so that the muscle tone and power should be still adequate.

Dr. Rowe agreed that the Judet operation would need modification. The position with regard to removal of the capsule was hard to understand. It seemed to be that in the Judet operation it should be left, but in the Smith-Petersen operation it should be removed.

Brachial Neuritis (Thoracic Outlet Syndrome).

LAMBERT ROGERS (United Kingdom), in the opening paper of a symposium on neurosurgical and orthopaedic aspects of brachial neuritis (thoracic outlet syndrome), said that the neuro-vascular bundle issuing from the thorax and passing into the arm might be interfered with by bony, cartilaginous or musculo-tendinous structures. Symptoms were then produced which were either vascular or neural in type and constituted the syndrome which had been variously called the costo-clavicular syndrome, the syndrome of cervical rib, the scalenus syndrome, and the syndrome of the upper thoracic opening. Pain in the upper limb, due to lesions of the upper thoracic opening, might be the result of compression of the subclavian artery (the costo-clavicular syndrome) or of irritation by a band, rib, the *scalenus medius* or any abnormal scalene muscle of the last trunk of the brachial plexus stretched over it and compressed from in front by the *scalenus anticus* (the scalene syndrome). Similar pain did not occur in the lower limb because acute angulation of the nerve trunks leaving the pelvis did not occur as it did with the neuro-vascular bundle leaving the thorax. The angulation in the case of the upper limb and its absence in the case of the lower limb were due to the upright posture. Elevation of the upper limb to a right angle would usually relieve symptoms, a fact which indicated that similar relief could be obtained from operation. Operation was best performed through an incision above the clavicle crossing the posterior triangle of the neck. It was not enough merely to divide the *scalenus anticus*, because the last trunk of the brachial plexus might still be stretched over and from time to time

be chafed by an underlying rib or band, or by the medial and tendinous lower fibres of the *scalenus medius* muscle. It was necessary to divide any such structure so as to free completely the last trunk of the plexus. Similarly, when the subclavian artery was elevated over an abnormal rib and compressed between it behind and the *scalenus anticus* in front, the part of the abnormal rib lying below and behind the artery should be removed so that the vessel was free to sink down onto Sibson's fascia.

DOUGLAS MILLER (New South Wales), in a paper on brachial neuralgia, said that any case of the condition might be due to congenital abnormality at the thoracic inlet, to aneurysm or to tumours, and all those had to be carefully excluded. The common types of brachial neuralgia occurring in the middle age group could conveniently be divided into those due to pressure on the plexus and those due to pressure or irritation of nerve roots at foraminal level. The two conditions had typically different clinical pictures, though the pictures were not always easily differentiated. The plexus compression could usually be seen to occur between the proximal part of the first rib and the anterior scalene muscle. It was not due primarily to scalenus compression, but would be relieved by scalene division. The group of nerve root compression was due to generalized compression of the root at the foraminal level. It was a misnomer to speak of the condition as due to "cervical disks", though degeneration and thinning of the disk were probably causal. Treatment should be carried out by traction, and if that was ineffectual operative decompression was advised.

C. A. HEMBROW (Victoria), in the third paper of the symposium, said that previously it had been considered that there were two main causes of brachial neuralgia—cervical rib and brachial neuritis, the latter term implying an infective or toxic inflammation of the plexus components. It was now known that there were many other conditions possible, the common basis being physical irritation of the nerves by compression or stretching. The symptoms resulting were distributed over the territory of a root or a peripheral nerve, and for accurate diagnosis it was necessary to consider those areas. In actual practice, however, it was frequently difficult to reach a definite conclusion. The diagnosis of brachial neuralgia was best made by considering a series of likely clinical entities, of which there were four common and several other rarer possibilities. A series of 60 cases with symptoms of brachial neuralgia was analysed into the following groups: (i) cervical osteoarthritis, (ii) thoracic outlet or scalene syndrome, (iii) costo-clavicular syndrome, (iv) cervical disk lesions, (v) other conditions. Cervical osteoarthritis might give rise to pain referred along the segment, as with other joints, such as the hip, but also as the result of interference with the cervical nerve roots. With thoracic outlet or scalene syndrome it was rarely possible to determine the exact cause of the compression before operation, and therefore the operation with the fixed purpose of removal of the cervical rib, or division of the *scalenus anticus*, had been displaced by an exploratory operation to find and remove, if possible, the true cause of the compression of the plexus and vessels and to set both free. The costo-clavicular syndrome included a group of cases with a variety of more indefinite symptoms attributed to pressure on the plexus and more especially on the artery in the region between the clavicle and the first rib when the shoulder was depressed. The main factor was probably traction, as the changes in the anatomical relations which resulted from postural errors rendered the plexus and vessels vulnerable to traction. Treatment was by correction of the causative factors, physiotherapy and postural reeducation.

LEIGH WEDLOCK (Victoria) said that some patients with the scalenus syndrome improved with shoulder elevation exercises and alleviation of fatigue. Indeed, some patients had been successfully treated in that way when surgical treatment had already failed. With regard to cervical arthritis, he warned that in some cases the condition was aggravated by mobilization. For those he advocated traction in a sling. Even an acute cervical disk syndrome could be relieved by traction. He thought also that pro-

longed immobilization had a place in the treatment of the condition.

J. A. JAMES (New Zealand) referred to the occurrence of nocturnal pain and asked speakers if that type of pain could be linked with the diagnosis. He asked also whether the first rib should be removed if on exploration no obvious abnormality was found. He remarked that if anaesthesia involved the posterior primary division of the plexus that would eliminate the diagnosis of scalenus syndrome.

F. P. MORGAN (Victoria) said that he had noticed that the cervical disk syndrome was much commoner in males and the scalenus syndrome in females. In cases of foramen compression a florid disk hernia had been found, and that should be removed in preference to indirect decompression. He quoted one case in which a subclavian aneurysm found at operation apparently resolved completely after removal of the first rib. He quoted another case of a patient under the care of Sir Alan Newton who developed gangrene of the hand and forearm. That had proved to be caused by a brachial artery passing through a supracondylar foramina.

R. S. COOPER (Victoria) discussed the position of the patient for operation. He said that he adopted the upright position, as then the symptoms were usually most prominent. He reported finding the subclavian artery well above the groove in the rib. He quoted the case of an elderly patient who had severe pain in one arm and eventually a very stiff shoulder and hand. The brachial plexus was explored and nothing abnormal found. The stellate ganglion was then removed and the combined procedure was followed by striking relief. Some relapse occurred after six months.

B. T. KEON-COHEN (Victoria) was interested in the aspect of the "frozen shoulder" and asked if there were any further comments on its causation.

Professor Rogers, in reply, said that nocturnal pain had also impressed him. He thought that the cause must be postural. He would certainly remove bone from the rib as a means of indirect decompression if no obvious lesion was present. Sex incidence had not been striking in his cases. While he had removed one subclavian aneurysm under unusual circumstances, he did not think that a small fusiform dilatation of the subclavian artery should receive any special attention, other than the treatment of the primary condition.

Dr. Miller, in reply, said that he was unable to amplify the question of stiff shoulder, and also stiff fingers, in the syndrome.

Dr. Hembrow, in reply, maintained that pain which appeared after rest and lessened with activity must be due to oedema or vascular change, and that that fact had some application to the phenomenon of nocturnal pain.

Continuous Immobilization of Joints in Rheumatoid Arthritis.

MICHAEL KELLY (Victoria) read a paper entitled "Continuous Immobilization of Joints in Rheumatoid Arthritis". He said that in rheumatoid arthritis the joints were chronically inflamed because they were repeatedly moved. Deformity and ankylosis were the end-results of a pathological process which should not have been allowed to develop, and which was perpetuated and intensified by repeated movements. In every joint except the hip and the joints of the spine, the pain, stiffness and swelling could be abolished by continuous immobilization for three to five weeks. The articular tissues returned to normal, and therefore the processes which led to ankylosis and deformity were reversed. A correct technique was important. Absolute immobilization was sought with plaster of Paris, and the unaffected joints of the same limb were left free. The limb should be used and the muscles which bore on the immobilized joint should be actively contracted repeatedly. While the knee or the joints of the foot were splinted, the patient should be encouraged to walk. While the shoulder was fixed, the elbow and hand should be

used. While the elbow was fixed, the hand, wrist and shoulder should be used. The wrist and the shoulder should be splinted so that free use of the fingers was permitted and the arm was used. The metacarpo-phalangeal joints were splinted so as to allow full movements of inter-phalangeal joints. When the splints had been removed the joints were splinted intermittently and movements were restored gradually by the gentlest active movements within painless range. A band caliper, which allowed the limb to bear weight, was useful for the knee, for both continuous and intermittent splinting. Within three weeks of removal of the splint the range of movement was usually greater than it had been before the splint was put on. The most crippling deformities were of the hand, the wrist and the knee. If those could be prevented the patient would always be able to walk and to use the hands. The integrity of those joints, therefore, should be the medical attendant's first concern. In the early stages, too, those joints were the most painful, and the relief from splinting was often dramatic. Rheumatoid arthritis was a reversible process, in the body as a whole and in each individual joint. In many cases the fixation of one or two severely damaged joints had set in motion a general remission. Pain and stiffness had disappeared from the shoulders soon after the wrist had been immobilized. A large number of joints might be splinted at once, with a remarkable improvement in general well-being. Rheumatic inflammation might reappear after removal of the plaster; then the procedure might be repeated. Continuous immobilization did not cause rheumatoid joints to ankylose. Paradoxically, it prevented ankylosis if the correct technique was followed. That principle had been recognized by several leaders of surgical thought during the previous century, but through fear of ankylosis the majority of the profession had persisted with active movements. The necessity of rest was generally acknowledged, but it was usually alternated with active movements, which directly contradicted the principle. Intermittent splinting was not successful in the treatment of active inflammation of a joint. When active inflammation had subsided, however, it was extremely valuable in preserving muscle balance and preventing deformity. Dr. Kelly showed more than sixty lantern slides to demonstrate the technique and to indicate that the range of movement of an inflamed joint was increased rather than diminished after continuous immobilization.

J. A. SHANASY (Queensland) asked Dr. Kelly where he would commence his immobilization if he had a patient with both shoulders, both wrists and both knees involved.

Dr. Kelly, in reply, said that he would immobilize both

wrists and one knee and allow the patient to walk. He said that the shoulders would improve with the immobilization of the wrists.

Some Rheumatoid Varieties and Variants of the Rheumatoid Syndrome.

L. J. A. PARR (New South Wales), in his paper on some rheumatoid varieties and variants of the rheumatoid syndrome, said that under the term rheumatoid arthritis many varieties of the disease were included. Infective arthritis might be distinguished from true rheumatoid arthritis, the former involving large joints and being asymmetrical, the latter involving small joints and being symmetrical. The former might merge into the latter after a variable period and therefore could be considered as an atypical variety. True rheumatoid arthritis occurred at all ages and in both sexes. Rheumatoid arthritis might be associated with vasoconstrictive phenomena, palmar erythema, or a syndrome like Raynaud's disease. Involvement of the collateral ligaments alone gave the picture of peri-arthritis, whilst *arthropathica psoriatica* revealed two forms, one lessened by the use of ultra-violet light and the other aggravated by it. Rheumatoid arthritis *mutilans* was easily recognized by bizarre appearances of the fingers and extensive bone absorption. In some cases there was a chronic, almost painless chronic synovitis, whilst in others acute synovitis and tendinitis constituted the picture. Still's disease might be typical, but in many cases no splenic enlargement and little adenopathy were present. Felty's syndrome was another variant and might be associated with splenic enlargement. There were still cases placed in the undetermined group, such as Jaccoud's variety. Rheumatoid arthritis might be associated with myxoedema, thyrotoxicosis, Addison's disease, Simmonds's disease and eunuchoidism, and in association with osteoarthritis could be called a mixed variety. With regard to treatment, certain remedies had been found to be valuable against certain varieties. Those remedies included gold, calcium, sulphonamides, especially "Proseptasine", "Promacetin" (acetosulphone), vitamin D, arsenic, "Etamon", insulin, blood transfusion and iron and cortisone (given intravenously).

A. G. TRINCA (Victoria) brought forward and discussed the question of infective foci associated with the cases of rheumatoid arthritis mentioned by Dr. Parr.

Clinical Meeting.

A clinical meeting of the Section of Orthopaedics and Clinical Medicine was held at Frankston Orthopaedic Hospital.

Section of Oto-Rhino-Laryngology.¹

President: R. M. Glynn, M.B., B.S., F.R.C.S.E., F.R.A.C.S., D.O.M.S., D.L.O. (R.C.P.S.E.), South Australia.

Vice-Presidents: B. B. Blomfield, M.B., B.S., F.R.C.S.E., F.R.A.C.S., New South Wales; Jean Littlejohn, M.B., B.S., D.L.O., F.R.A.C.S. (L.O.), Victoria; N. M. Cuthbert, M.C., M.B., Ch.M., D.L.O., F.R.A.C.S. (L.O.), Western Australia; S. C. Suggit, V.R.D., M.B., B.S., F.R.C.S., F.R.A.C.S., Queensland; G. J. Ramsay, M.B., B.S., Tasmania.

Honorary Secretary: C. Pyman, M.B., B.S., D.L.O., F.R.A.C.S., Victoria.

President's Address: Cancer of the Larynx.

R. M. GLYNN (South Australia), in his president's address, discussed cancer of the larynx. He said that there was still no uniformity of opinion as to whether irradiation or surgery was preferable in treatment. He thought most radiotherapists would agree that the following patients should be operated on: (i) those whose cord was fixed, especially if cartilage was involved; (ii) those with subglottic growths or extensions to subglottic areas;

(iii) those with *pachydermia laryngis*; (iv) those with post-irradiation local recurrences. The two types of case around which argument centred were: (i) early cases in which the lesion was limited to one cord and the condition was suitable for laryngofissure; (ii) cases in which carcinoma had extended beyond the scope of laryngofissure and for which laryngectomy was the only surgical alternative. As Cutler had pointed out, the latter was the important group, and he and other radiotherapists held that when such lesions were not completely fixed they were ideally suited for radiotherapy. However, there were many people, like Hayes Martin and Broyles, who con-

¹ The meeting held by the Section of Oto-Rhino-Laryngology with the Section of Anaesthesia has been recorded.

sidered that surgical treatment was still the method of choice in such cases, and held that the results of surgery were better than those of radiotherapy. Dr. Glynn then stressed the need for prophylactic removal of the glands in any but the earliest cases in which treatment was by laryngectomy. In Adelaide, results had been infinitely better when surgery was used than when radiotherapy was given. In a period of fifteen years, out of 144 patients, 64 had palpable glands and 63 had not. Of the latter, 34 were treated by irradiation and 29 were operated on. Only two of the 34 patients treated by irradiation were still alive, both over five years later. Of 29 operated on five had undergone laryngofissure, and if patients treated well over five years previously were referred to as "cured", and those treated less than five years previously but still alive were regarded as "promising", then three had been "cured" and two were "promising". Nineteen patients with endolaryngeal cancer had undergone laryngectomy, thirteen with intrinsic growths and six whose growth had extended above those limits. Of those patients 14 were still alive, ten "cured" and four "promising". A further five patients with extrinsic growths had been operated on, but only two lived over five years, and one of them had since died.

Endoscopy for Foreign Bodies in Food and Air Passages.

E. A. MATISON (South Australia) read a paper entitled "Endoscopy as Applied to the Removal of Foreign Bodies from the Air and Food Passages". He said that he had accepted the invitation to present a paper on the subject, not because he had anything original to contribute, but because the subject had not been brought before the previous congresses. As the number of cases that came to endoscopists individually was not great, he hoped that a paper on the subject would bring about a fruitful discussion from which conclusions would be arrived at which would be of benefit to those doing endoscopic work. He regretted that peroral endoscopy was not employed more frequently by the medical profession generally as an important aid in the diagnosis of oesophageal and broncho-genic lesions.

Discussing the ætiology, Dr. Matison said that carelessness while eating and in the preparation of food was the major cause of the entry of foreign bodies into the air and food passages. Pathological changes in the lungs caused by foreign bodies depended firstly upon their nature—vegetable foreign bodies produced the greatest changes while metallic foreign bodies produced the least change—and secondly, upon the degree of obstruction to the entry and exit of air from the affected part of the lung. There were cases, however, in which the presence of a foreign body was revealed only by the bronchoscope or oesophagoscope. Dr. Matison described two cases of foreign bodies in which a persistent cough extending over a period of years was the only symptom, and another case of "asthma" occurring from birth in a child, aged three years, which was found to be due to an open safety-pin in the subglottic tissues.

RAYMOND HENNESSY (Victoria), in opening the discussion, said that an aphorism applicable to the subject was that removal of foreign bodies in private practice, like crime, did not pay. Dr. Hennessy confined his remarks to children. In twenty-five years he estimated that he had removed about 200 foreign bodies from the air passages and about 300 from the food passages. A review of the five-year period ending in 1950 showed that 53 foreign bodies had been removed from the air passages, of which 21 were peanuts, and 62 foreign bodies from the oesophagus, of which 11 were safety-pins and 36 were coins. The youngest child on whom he had performed bronchoscopy for a foreign body was aged nine months, and the youngest requiring oesophagoscopy was aged forty-six days. Under the age of twelve months foreign bodies were more common in the oesophagus, and of those the safety-pin was the commonest. In the bronchial tree peanuts were the commonest foreign body, and in that connexion it was interesting to note that during the war, when peanuts were scarce, very few cases occurred. As soon as the war

was over and peanuts became more readily available, there was a fresh spate of cases. He had been surprised in recent years to see how little reaction there was in the bronchial mucous membrane, even when the peanut had been present for many months. For instance, in one child, aged fourteen months, a peanut which had been present for five months had produced comparatively little reaction. He supposed that the reason lay in the fact that there must be a different method of preparing peanuts; it appeared that the peanuts were prepared in oil and salted.

Dr. Hennessy went on to say that so far as technique was concerned he thought that methods had to be adapted to the conditions available. For anaesthesia he preferred plain ether and no premedication. A head rest in his opinion was indispensable. He had found the Negus infant-sized tube to be best for babies under eighteen months. He sounded a note of caution against the use of the general electricity supply, and advocated the use of dry cells exclusively. In diagnosis a good X-ray technique was invaluable for demonstrating non-opaque foreign bodies, which could be demonstrated with as much certainty as opaque foreign bodies. Referring to cases in which he was unable to remove the foreign body through the mouth, Dr. Hennessy said that he did not hesitate to ask the thoracic surgeon to remove it by thoracotomy. He had had experience of five cases in which complete recovery had occurred after removal of the foreign body by a thoracic surgeon. Lobectomy was necessary in two of them.

E. P. BLASHKI (New South Wales), in reference to Dr. Hennessy's remarks about not relying on fluoroscopic screening, said that in cases of bronchial foreign body he thought one should not rely solely on X-ray films either. Frequently the skiagrams had been taken some time before and did not show the position at that particular moment. It was necessary also to ensure that the X-ray films covered the patient from the top of the post-nasal space to the diaphragm. There was great need to impress on house surgeons that foreign bodies in the oesophagus were an urgent matter. Reverting to X-ray pictures, Dr. Blashki commended the barium capsule advocated by Chevalier Jackson rather than the barium bolus; he said that the latter made inspection of the foreign body difficult at the subsequent oesophagoscopy examination. He had found a special trolley with apparatus all ready for use to be valuable, particularly for taking to patients in bed in emergencies. He agreed with Dr. Hennessy about the value of a head rest. One piece of advice which he offered to others because, when he first encountered the problem, he did not know the answer, was illustrated by the following case. An elderly man had swallowed his complete lower denture, and for some reason it had remained in the hypopharynx for four days before removal was attempted. Repeated attempts at removal with forceps were unavailing. The answer was to pass a snare loop over one end of the denture, which then turned round and came out easily.

N. H. MEACLE (New South Wales) said that he had had the same experience as Dr. Hennessy with regard to the minimal reaction to peanuts in recent years. He believed that the presence of some foreign bodies in the bronchus could be an urgent matter, and recalled some patients who had been admitted to hospital in great distress with a provisional diagnosis of laryngeal diphtheria; bronchoscopic removal of the foreign body as an urgent measure had been life-saving. Another problem was that of poliomyelitis patients who had undergone tracheotomy and who later had aspirated their first solid food into the tracheo-bronchial tree. They, too, were in need of urgent treatment.

N. M. CUTHBERT (Western Australia), referring to anaesthesia, said that he had found it difficult to estimate the amount of collapse. He recalled a young patient sent 350 miles to Perth with a bean in the bronchus. The child was in a state of extreme collapse, but after the removal of the foreign body by suction his condition was virtually normal within a quarter of an hour. Dr. Cuthbert advocated palpation of the neck in any case of foreign

body. If there was pronounced tenderness or swelling, he advised delay for twenty-four hours with antibiotic treatment meanwhile. Referring to multiple foreign bodies, he mentioned the case of a patient admitted to hospital from a mental hospital with a swelling of his neck and a history of a foreign body. At operation Dr. Cuthbert, to his consternation, removed a vertebra; closer inspection showed it to belong to a dog, and reintroduction of the oesophagoscope revealed a second vertebra, which he also removed. The patient recovered, but before his return to the mental hospital X-ray examination revealed 150 foreign bodies in his abdomen.

R. M. GLYNN (South Australia) advocated later X-ray examination in some cases. He had been asked to remove a nail which had been shown in an X-ray film to be present in a boy's lung. At bronchoscopic examination the next morning he could find no sign of it in the bronchial tree. A film taken on a portable machine in the operating theatre showed the nail then to be in the stomach. Apparently the boy had coughed it up overnight and then swallowed it.

Dr. Matison, in reply, thanked the various speakers, and said that he would like to include general practitioners as well as house surgeons in Dr. Blashki's remarks about the urgency of foreign bodies in the oesophagus.

Oesophageal Obstruction in Childhood: A Clinical Study.

RAYMOND HENNESSY (Victoria), discussing oesophageal obstruction in childhood, said that there were five natural clinical groups, with which he would deal. The first group comprised cases in which the continuity of the oesophagus was interrupted, including cases of congenital oesophago-tracheal fistula. Dr. Hennessy referred to the developmental anatomy and then to the symptoms and signs. He said that in the diagnosis lipiodol, not barium, should be used for the X-ray examination, and in small quantity. An important sign was the presence of air in the bowel. The diagnosis was certain if a soft rubber catheter passed through the mouth was arrested at about 10 centimetres. The commonest type of abnormality was when the upper segment was blind and the lower segment entered the left bronchus or the trachea. Other symptoms and signs were salivation, cyanosis, coughing and abdominal distension.

The second clinical group comprised cases of congenital stenosis in which the continuity of the oesophagus was not interrupted, including cases of thoracic stomach and short oesophagus. Simple stenosis was not usual. There was generally some other primary condition such as sacculatation or pouching. Usually the lower third was affected. The secondary changes were due to food stagnation, which caused chemical decomposition with irritation and oesophagitis; intermittent obstruction with relief would occur. Discussing thoracic stomach, Dr. Hennessy said that the amount of stomach in the thorax was variable, but sometimes clearly demonstrable to the naked eye. He referred to the ease of dilating the stricture in early cases, with no corresponding permanent benefit. Later on some temporary improvement might follow dilatation on account of the development of fibrous tissue in the vicinity of the stenotic area. In previous years gastrostomy was the only feasible operation. Now the operative results obtained by excision were better than those following a plastic operation.

Dr. Hennessy then went on to the third group, which comprised cases of inadequate or patent cardia—the condition of cardio-oesophageal relaxation in infants. He said that the condition appeared to be the opposite of achalasia. The X-ray findings were generally fairly characteristic. By inverting the child one could usually cause the oesophagus to fill with barium. Vomiting of material containing blood, or the presence of coffee-ground vomitus, was a common symptom. It was unnaturally easy to pass a tube into the stomach, as if the cardia was patulous. It was recommended that affected infants after being fed should be kept for some time in a more or less erect position.

The fourth group comprised cases of acquired stricture, generally due to caustic soda burns. The lesion was usually imperfect, and due to splashing. As a rule there was more than one stricture above and below the level of the bronchus; the strictures were not necessarily in the same straight line. The depth of the burn varied from scorching to total destruction of the oesophageal wall. In the usual mild cases, the permanent symptoms of intermittent dysphagia developed in about six to eight weeks. Early gastrostomy were generally two to three years. There was bouginage was successful. Auto-bouginage was generally necessary when the patient was capable of carrying it out. The duration of treatment and the maintenance of gastrostomy was generally two to three years. There was a tendency for food particles to act as obstructing foreign bodies and to require removal by oesophagoscopy.

The final group comprised those in which foreign bodies were the cause of the obstruction. In babies respiratory symptoms might predominate.

N. H. MEACLE (New South Wales) said that he agreed that congenital oesophago-tracheal fistula was much more common than had been supposed. At the Royal Alexandra Hospital for Children diagnosis was usually made without recourse to oesophagoscopy, which was used only in case of doubt. A high mortality rate was associated with the operative treatment, which was made even more discouraging by the associated serious malformations and defects commonly found elsewhere in the patients. Dr. Meacle said that he had been interested in Dr. Hennessy's post-operative oesophagoscopy findings in the patients successfully operated on by Dr. Russell Howard. In Sydney Dr. Eric Goulston had so far successfully operated on three such patients.

Referring to congenital stenosis when the continuity of the oesophagus was not interrupted, Dr. Meacle said that in the past ten years about ten cases had been recorded at the Royal Alexandra Hospital for Children. Until recent years the treatment had been to relieve the patients by repeated dilatation of the stricture, and in the more severe cases by gastrostomy. Disease and malformations of the oesophagus had been neglected until recent years. With the progress of thoracic surgery operations on the oesophagus had become much safer. A disease which had become the object of renewed interest was congenital hiatus hernia coexisting with shortening of the oesophagus; its importance as a cause of stenosis of the lower end of the oesophagus was recognized. His findings on clinical examination of patients with congenital oesophageal stenosis tallied closely with the description given by Dr. Hennessy. Treatment by oesophageal dilatation had in most cases given only temporary relief.

Dr. Meacle went on to say that in a recent report Dr. T. Y. Nelson had drawn attention to the occurrence of hiatus hernia in infants and young children, and had expressed the belief that if that condition was treated at an early stage, the occurrence of serious complications might be prevented. Dr. Nelson also believed that other patients admitted to hospital with a diagnosis of oesophageal stricture might with further investigation be shown to be suffering from hiatus hernia. Dr. Meacle, by way of contrast, quoted the case of a child who had had difficulty in swallowing from birth, and who had been admitted to hospital on numerous occasions for the removal of foreign bodies. Oesophagoscopy examination revealed a narrowing of the oesophagus at about its middle third. The constriction admitted the passage of a number 20 "French" oesophageal dilator with very little resistance. A diagnosis of congenital oesophageal stricture had been made. Repeated X-ray examinations had been made, and up to the present no evidence had been found of the presence of hiatus hernia and short oesophagus.

Dr. Meacle then referred to inadequate or patent cardia—cardio-oesophageal relaxation in infants—which had been described by Dr. Hennessy. He said that the condition was attracting interest at the Royal Alexandra Hospital for Children, where X-ray demonstration of regurgitation of barium into the oesophagus on compression of the abdomen had been carried out. On several occasions he

had made an œsophagoscopic examination of the infants in an attempt to detect the cause of vomiting. The œsophagoscope passed easily into the stomach, and he had never encountered any definite obstruction or other abnormality. No conclusion appeared to have been reached about that condition.

On the subject of acquired stricture, generally due to caustic soda burns, Dr. Meacle asked Dr. Hennessy whether he treated all such patients by retrograde bouginage. He said that he himself had had satisfactory results from treatment by direct œsophageal bouginage with silk-woven œsophagoscopic bougies. Dilatation was carried out by slow progression of increasing sizes of the bougies, and was never done blindly.

C. J. O. BROWN (Victoria) said that, although Ladd and Leven and others had devised multi-stage operations for babies with congenital œsophago-tracheal fistulae and had achieved some success, it was not until Cameron Haight published his first report of direct suture of the œsophagus in 1943 that interest was really aroused. Dr. Officer Brown said that Dr. Hennessy's second group of patients with congenital stenosis, in which the continuity of the œsophagus was not interrupted, had interested him. Over the years he had seen many adults and a few children with short œsophaguses and thoracic stomachs. At first, following Harrington, he had advised dilatation and occasionally crushed the phrenic nerve, although he could not say that that procedure ever appeared to produce any improvement. With the development of thoracic surgery, Allison, Barrett and others had come to appreciate that many so-called short œsophaguses were not in fact short, but that the primary defect was a sliding hiatus hernia resulting in an incompetent cardia above the diaphragm. Regurgitation of acid gastric contents resulted in œsophagitis, ulceration, stricture formation and scarring, and in some cases those changes eventually produced permanent shortening of the œsophagus. Before that stage was reached, complete cure followed reduction and repair of the hernia. Dr. Officer Brown said that in the last few years he had operated on many patients with radiological evidence of a short œsophagus, and had never failed to reduce the cardia below the diaphragm. He described two cases to illustrate his remarks, and said that in March, 1951, Husfeldt, Thomsen and Wamberg had reported a series of 24 cases of short œsophagus in children, and had concluded that in all cases the primary condition was a sliding hiatus hernia and that congenital short œsophagus did not exist or was extremely rare. They had distinguished two types. His cases illustrated their first type, and he thought it corresponded to some of the cases included in Dr. Hennessy's second group. Their second group included the type of condition described by Neuhauser and Berenberg as cardio-œsophageal relaxation, and in five of the six cases in that group the diagnosis was verified at operation. Ten of the 24 patients underwent operation, and in eight the hernia was reduced and repaired. One had a penetrating ulcer and œsophago-gastrostomy was performed; in one the hernia was considered irreducible at the time of operation, and the patient's condition was not improved. Neuhauser and Berenberg believed that with increasing experience the hernia could have been reduced, and they proposed to operate again.

Dr. Officer Brown went on to say that the œsophagus was a very elastic structure and shortened if it was relaxed. X-ray examination and œsophagoscopy proved the presence of a short œsophagus; but neither method could distinguish between relaxation shortening and true abnormal shortening. Oesophagitis might cause vomiting and dysphagia as a result of spasm or ulceration, or true stricture formation. If the cardia could be replaced below the diaphragm, œsophagitis, spasm and ulceration disappeared. Strictures might still be troublesome and might require dilatation after the hernia had been repaired. The problem was complicated, as Barrett had pointed out, by the fact that there was another group of people in whom the lower part of the œsophagus was lined by gastric mucosa and was therefore liable to the development of

true peptic ulcers. The external appearance of the œsophagus in those people was completely normal; there was a competent hiatus and no peritoneal hernial sac.

Dr. Officer Brown said that no method of treatment of the stricture that did not restore the cardiac pinchcock could be expected to give lasting good results. If the cardia was above the hiatus he did not think that local excision of the stricture should be carried out. The position might be compared with that of the duodenum in patients with duodenal ulceration. Remission and relapses might occur. For many years gastro-enterostomy was used in the treatment of duodenal ulcer, and many patients had been relieved for varying periods. Dr. Officer Brown thought that the same might apply to œsophageal regurgitant conditions when dilatation or local excision was carried out. Oesophago-gastrostomy was equally faulty. If operation was necessary for patients with œsophageal ulceration and strictures and short œsophagus, when the cardia could not be restored to a normal position, he believed with Allison and Barrett that the only worthwhile method was to by-pass the stomach and join the œsophagus to a prepared loop of jejunum. Short strictures not associated with an incompetent cardia might at times be suitable for local excision.

H. D'A. SUTHERLAND (South Australia) said that he thought Dr. Meacle might have been too depressing in his figures for tracheo-bronchial fistula. There had been several successful cases at Adelaide in recent years. In one case in particular a stricture developed after operation, which he successfully removed when the patient was aged twelve months. With reference to Dr. Hennessy's second group of cases, Dr. Sutherland mentioned a case in which he had resected the stricture, only to find to his consternation that there was a second stricture below it. This he had dilated, and then he had left in the thickest tube which would fit through the child's nose and through the dilated stricture, for three months. The result was completely successful.

R. H. VON DER BORCH (South Australia) said that he was impressed by Leegaard's observations on caustic soda burns. The essential factor was to try to prevent stricture formation. About one week after the caustic soda had been swallowed, at œsophagoscopic examination one could with experience tell the degree of burning. If it was of third degree or worse, a stricture would be likely. He advocated leaving the largest catheter in place. At Adelaide they had been left in for as long as six months.

R. V. BLAUBAUM (Victoria) said that he had observed three cases of œsophageal webs in children, two in the post-cricoid region, and one near the aorta. They had been broken down by the œsophagoscope and had not recurred. He wondered whether Dr. Hennessy had had any experience of them.

G. I. HENDERSON (Western Australia) wondered whether congenital strictures always needed thoracotomy. He recalled the case of a boy whose congenital stricture he dilated from time to time, and who by the age of nine years was completely normal. If confronted with a case now, he would be inclined to try that measure first.

Dr. Hennessy, in reply, said that he did not treat all caustic soda burns by retrograde dilatation. With regard to webs, he had not encountered them in the œsophagus. Referring to the method of leaving a tube in place in caustic soda burns, he said that he thought it must be very irksome to have a tube in place for as long as six months.

Fenestration.

Observations on the Fenestration Operation.

S. SUGGITT (Queensland), in his paper on the fenestration operation, said that care in the selection of patients for fenestration had a greater bearing than surgical technique on the resultant gain in hearing. Loss of tinnitus and absence of paracusis were generally associated with poor results. A wide difference in the hearing levels of the two ears, a middle tone dip, an air conduction loss over 60 decibels in the speech frequencies, and an upper tone limit below 6000 cycles per second were bad prognostic signs.

The rate at which the hearing had deteriorated was more significant than the duration of the deafness. Audiometric estimation of the bone conduction was the most useful single test. It was essential that the normal bone conduction for a given audiometer in given surroundings should be known before a true estimate of the patient's bone conduction could be determined. The correction required for one audiometer was shown, together with the greatest bone conduction loss that was consistent with operability, and also that degree of loss below which first-class results were unlikely. The Carhart notch was described. The greatest improvement obtainable gave a hearing level nearer to the normal line than would be anticipated from theoretical considerations of the loss in hearing following exclusion of the middle-ear mechanism. The critical period for closure of the fenestra was the first four months after operation. Dr. Suggit finally described certain instruments that were useful in the fenestration operation.

D. F. O'BRIEN (Victoria), in opening the discussion, said that in the testing of patients for suitability for operation 2048 cycles per second should be considered the most important frequency. The patients should be divided into the following three groups: (i) suitable—hearing loss at 2048 cycles per second not greater than 50 decibels; (ii) unsuitable—hearing loss at 2048 cycles per second greater than 60 decibels; (iii) borderline—hearing loss at 2048 cycles between 50 and 60 decibels. The last group was the most difficult to assess. Particular attention should be paid to bone conduction. With regard to bone conduction, a 1024 cycle per second tuning fork should be used. If the patient could hear it for five or six seconds longer by bone conduction than he (Dr. O'Brien) could hear it by air conduction, that patient would be suitable. Discussing the question of what was the lowest threshold level at which operation should be considered, Dr. O'Brien said that the maximum improvement to be anticipated was to bring the average level for speech frequencies to about 20 decibels, owing to loss of the ossicular chain. It was better not to operate till the hearing at 2048 cycles per second was lower than about 35 decibels unless there was a special indication, such as the patient's work. The same level could be achieved later without any greater risk and with more noticeable benefit. Referring to the operation of fenestration in pregnancy, Dr. O'Brien said that two women, both about three months pregnant, had been operated on; there were no ill effects, and both had maintained their improvement, one for thirteen months and one for fifteen months. Three other women had become pregnant since operation, and all had maintained their initial improvement. Age alone was no contraindication. One man was aged forty-eight years when operated on five years earlier, and the result was still satisfactory. However, very few subjects in the upper age group were suitable for operation.

G. C. HALLIDAY (New South Wales) said that he was in entire agreement with much of what Dr. Suggit had said, though he questioned some of his generalizations in regard to those patients suitable for surgery. Dr. Halliday did not think that there was any definite age limit which would contraindicate operation on a suitable patient. Because he was aged fifty years, a subject who was on all the criteria suitable for operation should not be debarred from operation on age alone. Again, a difference between the two ears of more than 15 decibels did not, in his opinion, indicate a poor operative risk, unless there was evidence of cochlear nerve degeneration as shown by a greater drop in air conduction loss of more than 55 decibels, and by a reduced bone conduction threshold in the frequencies from 500 to 2000 cycles per second. A difference of 15 decibels was often seen in those cases in which one ear became affected first; but that difference might disappear as the otosclerotic process became more advanced in the ear affected at a later date. Dr. Halliday went on to say that in his first 100 cases for operation in the years 1947-1948, nine patients did not have the symptom of paracusis, but the post-operative result was successful in seven of them. With regard to high tone loss, 27 patients were affected, and there was a tendency for a slight recession on the original improved hearing standard

in a majority of cases, except in those in which the high tone loss was of the "ski" variety—a type which occurred abruptly at either the 2000 or 3000 cycles per second frequency. Eight patients had been operated on between the ages of fifty and sixty years; in three instances the result was a failure, and one patient had only very moderate improvement. In the under twenty years group, two out of three patients operated upon had a good final result.

Dr. Halliday then said that in the initial examination of patients careful tuning fork tests with matched forks of frequencies of 256, 512, 1024 and 2048 cycles per second were used, with the base end of each about the size of two shillings. In the selection of the forks it was essential to have those in which, after adequate stimulus, the note could be heard for approximately sixty seconds by air conduction in the 512 cycles per second frequency, and for corresponding periods in the remainder. A Rinne test was accurately made with each fork, and typically it would be found in clinical otosclerosis that the Rinne test result was negative at the frequencies of 250 and 500 cycles per second, indefinite at 1000 cycles per second, and positive at 2000 cycles per second, while with masking of the other ear with a noise box, all forks should be well heard. In the taking of audiograms the importance of correct calibration of the audiometer could not be overstressed, and that was particularly true of bone conduction. Possibly the bone conduction chart was the most important feature in assessing a patient's suitability for operation. Dr. Halliday said that Dr. Suggit had not discussed the question of discrimination of speech, but he himself thought that it was one of the most important investigations, especially in those cases in which there was some doubt as to the suitability for operation. Dr. Silverman, of St. Louis, United States of America, said that, given the history and the powers of discrimination for speech which a patient manifested, his suitability for operation could be established in nine cases out of ten without further clinical investigation. The test for the social adequacy index—the threshold for "spondee" words at levels of 20, 35 and 50 decibels above the threshold level for the "p.b." list—was also of considerable help in the doubtful case.

E. L. GUTTERIDGE (Victoria) referred to patients whose hearing deteriorated four months after operation. On examination this was found to be due to bony sclerosis. Shambaugh considered that small spicules of bone were responsible for this, and in an attempt to obviate it used continuous suction. Dr. Gutteridge thought that the ideal was not to use a burr at all, because it was the burr which made the spicules. He himself had abandoned it for making a window and used Lempert's technique, which left no bone dirt on the flap. He had re-operated on 11 patients whose hearing had deteriorated after four months, and found that in ten of them the fenestra was filled with fibrous tissue and in one was filled with bone.

R. H. VON DER BORCH (South Australia) offered a suggestion about equipment. He said that in making the fenestra he used a binocular loupe. He had a "4.12" reading glass prepared in such a way that a small arc was cut out of one side, and this gap still left enough room for instruments to be inserted through it. A curved eye dropper, in his experience, made a useful sucker.

R. V. BLAUBAUM (Victoria) said that he had not had the experience of the previous speakers, but he found great value in a voice test. There was a type of otosclerotic patient with a curve showing a loss at about 50 decibels; with such patients he walked up to them and asked them to let him know when he could first be heard. He then did the same and found out the first point at which his voice could be understood. He generally liked those two figures to be much the same. If there was a great discrepancy between the two it was unlikely that the result would be a good one.

G. I. HENDERSON (Western Australia) agreed with Dr. Blaubaum, and advocated Silverman's test.

D. G. CARRUTHERS (New South Wales) commented on a proportion of the good results and said that he felt that

many of the bad results were probably due to bad testing. A major problem in the testing was that there was still not a means of testing bone conduction without overlap from the other ear, in spite of masking. Referring to Dr. Suggit's sucker, he suggested that the pieces were not deep enough and they would be better if they were adjustable.

H. J. EIZENBERG (New South Wales) referred to the importance of careful selection of patients, and to the fact that the technique must be meticulous. He considered that Lempert's cupola technique offered the best results.

C. N. L. CANTOR (Victoria) said that he preferred the method of invaginating the flap into the fenestra as advocated by Lempert. He himself had found no deterioration occurring after pregnancy.

Dr. Suggit, in reply to Dr. Carruthers, said that it was intended to put fine plastic tube on the sucker tube. Speaking in general about the relative merits of fenestration and hearing aids, he said that he had found that if one asked the average patient which she would prefer she usually chose fenestration. He stressed the fact that there was never any hurry to perform the operation. That was well exemplified during pregnancy, when he refused to perform the operation at all. The patient could well return for the operation after the pregnancy. He agreed with Dr. O'Brien that an audiogram showing poor bone conduction was not necessarily a bad sign.

The Healing of Fenestration Cavities.

A. B. K. WATKINS (Newcastle, New South Wales), in discussing the healing of fenestration cavities, recorded his surprise, when first coming in contact with fenestration work, at the degree of infection in, and at the length of time required for, healing of fenestration cavities, such wounds being clean at the onset. He referred to statements by the head of one of the larger London clinics to the effect that 20% of the fenestration cavities at his clinic were still discharging at the end of nine months. After discussing the nature of the infection and referring to the respective methods of its treatment, Dr. Watkins gave it as his opinion that the delay in healing was due to infection of the comparatively large raw area left in the wound, and without claiming that skin grafting was at all new, he recorded his experiments with skin grafting in 25 consecutive cases in an attempt to accelerate healing.

In the fastest case healing had occurred in the remarkable time of twenty-two days. At the end of thirty days healing had occurred in eight cases with an average healing time of twenty-six days. At the end of sixty days healing had occurred in 18 cases with an average healing time of 34.7 days. At the end of ninety days, in only three cases had healing not occurred; these three cases had eventually reduced the average time of healing for the twenty-five cases to 68.6 days. Dr. Watkins laid emphasis on the rapid healing when all the grafts survived, and he pointed out that healing occurred more slowly when the grafts had been partly or wholly lost. He gave details of the methods used in obtaining his results. Results were excellent from the point of view of hearing.

Dr. Watkins also pointed out that, in spite of denial of the fact by authority, chronic mastoiditis was sometimes a cause of persistent discharge after fenestration. He also discussed the problem of treatment of *Pseudomonas pyocyanea* infection.

G. C. HALLIDAY (New South Wales), in opening the discussion, said that while the rate of healing for the fenestration cavities had no bearing on the ultimate success of the operation from the hearing viewpoint, slow healing was by far the commonest complication following the fenestration operation and was most annoying to patient and surgeon alike. It might be of considerable economic importance to a country patient. In no clinic in the world had he seen results to equal those of Dr. Watkins in the rapidity with which a dry cavity was obtained.

Dr. Halliday went on to say that at the Royal Prince Alfred Hospital, Sydney, the group working with him had

operated upon some 400 patients. For the first two years a complete exenteration of mastoid cells was attempted, but from that period the cavity was reduced in size by leaving alone the mastoid cells in the region of the tip at a level below the inferior meatal wall. That resulted in much more rapid healing of the postero-inferior portion of the cavity, which had previously been slow in healing. Any loose bone was removed from that region, but care was taken not to remove even the mucous membrane lining the cells. The three classical incisions of Lempert had been followed throughout in all cases, and increasing care had been taken to remove the fibrous tissue between the skin margins and the temporal muscles. That had resulted in the avoidance of any stenosis of the meatal canal which, in a number of cases, was a potent cause in failure of the cavity to heal satisfactorily. Great care should also be exercised at the lower end of the incision to remove any cartilage which had been denuded of perichondrium. All bony trabeculae must be carefully removed from the lateral sinus wall to the anterior bony meatal wall, and that area smoothed with a polishing burr. Finally, before the end of the operation, the closest search must be made for any foreign body such as bone chips or macerated periosteum. In the fashioning of the flap it was most important that any cartilaginous remnants should be removed and that the flap should be made as thin as possible, or otherwise later contractures might occur, pulling the epithelial lining away from its bony wall. Those cavities then were extremely difficult to heal.

Many types of powders, including sulphanilamide, Sulzberger's powder (*Pulvis Iodoformi et Acidi Borici*), boric acid, penicillin and sulphanilamide, and finally "Chloromycetin", had been used in an attempt to assist healing. Until "Chloromycetin" was used by very light insufflation, a percentage of all cavities would produce granulation tissue, and that might continue for any period even up to a year despite the strictest asepsis. For the past six months the use of "Chloromycetin" with minimal interference with the cavity has been the routine treatment, and Dr. Halliday did not think that granulations had occurred in one of the last forty cases, while the healing had been greatly accelerated. He said that it had been his practice for some months to take material for culture from the deep part of the dressings at the first dressing, and as the haemolytic *Staphylococcus aureus* (coagulase-positive) had been found on several occasions, aureomycin was now given in all cases for two or three days after the first dressing. Previously an infection had occurred in several cases after the first dressing and the whole drumhead had sloughed away, and in each case that was found to be due to the haemolytic *Staphylococcus aureus* which was insensitive to penicillin. Since aureomycin had been given no such catastrophe has occurred. No patient in the series had developed secondary mastoiditis. In conclusion, Dr. Halliday said that his only excuse for not using the skin graft technique would be that with "Chloromycetin" rapid healing now took place.

E. GUTTERIDGE (Victoria) said he thought that the important factor lay in the technique in the early part of the operation. He folded the posterior meatal flap back and kept it in place by means of sponge. This allowed of subsequent easy inspection and also allowed air to enter the cavity. He thought that any granulations which might occur were due to sulphadiazine sensitization or to infection.

D. G. CARRUTHERS (New South Wales) said that he had found that the discharge had never lasted for long. It had not come from the mastoid cells or the flap, but had always come in his experience from the lower end of the wound, fairly superficially. This was an area that was difficult to epithelialize. He wondered what was the reason for this, and whether it could be due to the poor blood supply, or to muscle movements, or to the tendency to stenosis. He himself had tried grafting in his last few cases. He had used skin from the mastoid area, but found it a failure. As far as infection was concerned he had not been bothered by troublesome bacteria. When doing dressings he did not put anything in the cavity, except a

sucker. Later he had found that chloramphenicol powder was the best.

J. H. SHAW (Victoria) said that he had not used skin grafting for many years, but there was no doubt that healing took place much more quickly when grafts were used. However, the trouble came later, because the graft was on a hard bed with no blood supply. Wax then accumulated and led to breaking down of the graft, and an ulcerated area formed and persisted. For that reason Dr. Shaw avoided grafting and left the meatus wide open.

R. WILLIS (Victoria) agreed that interference should be avoided as much as possible. With reference to chloramphenicol, he said that he had found it sometimes had its limitations too. For instance, he knew of one patient whose ear was still discharging three years after operation. With all forms of treatment it dried in a few days, but a few days later the discharge recurred and fungus was evident. Finally, he asked whether the healing of the cavities was so much worse than that of the cavities after mastoidectomy before antibiotics were in use.

H. WATSON (Victoria) reported successful results with "Sulphamar" for *Pseudomonas pyocyanea* infections.

P. RUNDLE (Queensland) said that he was strongly opposed to ear drops and antibiotics used locally and was more in favour of powders.

H. J. EISENBERG (New South Wales) reported that he had found the number of infections lessened by meticulous care of the meatus before operation.

N. M. CUTHBERT (Western Australia) said that he thought an important principle was to try to keep the cavity closed. For instance, in facial nerve decompression, in which the cavity was completely closed up, infection rarely supervened. In that regard he thought there was some hope for the conjunctiva method, particularly when the cavity could be completely closed after it. He wondered whether the skin graft acted as a temporary protective mechanism.

Dr. Watkins, in reply, assured Dr. Eisenberg that cavities treated by skin grafts did not appear more likely to break down than others, and that on inspection afterwards they appeared identical. In reply to Dr. Shaw, Dr. Watkins said that once he had agreed with him that split thickness grafts could not survive on freshly exposed bone, as the only way in which they could obtain their nutrition was by means of the vessels on the surface. Subsequently he realized that he was wrong after seeing the results of skin grafting in the Ferris Smith pan-sinus operation. Subsequently he found that split thickness grafts maintained their vitality without a blood supply for a surprisingly long time, and in grafting elsewhere he had often used grafts kept cool in a refrigerator four weeks after they had been cut without being able to note any diminution in their tendency to "take".

The Alleviation of Deafness.

G. I. HENDERSON (Western Australia), discussing the alleviation of deafness, said that his paper was based largely on the work of a clinic in Scotland which dealt with all the problems of deafness at all ages. It differed from many others in that it was directed by an otologist and not by a psychologist. Dr. Henderson gave a brief sketch of the layout designed by himself and of the equipment required. He made a plea for the audiologist, and described a new medical auxiliary, the audiometrician. He then went on to discuss the application of some of the hearing tests, and mentioned the results obtained by the recruitment test and the difference limen test. Inflation of the auditory tube was discussed in relation to the interpretation of the auscultation sounds. Dr. Henderson went on to say that in the examination of children the Manchester technique was followed, but disappointing results were obtained from the use of the peepshow technique. Radium therapy was preferred to radon and X-ray therapy in catarrhal deafness. The indications for the performance of fenestration in the treatment of otosclerosis were now standardized. Dr. Henderson laid stress on the

psychological aspects of deafness, and said that much could be done to improve the position in that sphere. Referring to occupational deafness, Dr. Henderson said that the selection of workers in noisy occupations should be made by fatigue tests, and that occupational deafness should be included in Schedule III of the *Workers' Compensation Act* in Western Australia and certain other States. Dr. Henderson then mentioned experiences in the provision of hearing aids and their use, and criticized the present method of sale. In conclusion, he said that preventable deafness still existed, and a wide field for both clinical and technical research lay open.

JEAN LITTLEJOHN (Victoria), in opening the discussion, said that she both admired the true Scottish thoroughness of Dr. Henderson's methods and envied the facilities and money to which he had access. In Australia much confusion resulted from divided control by the various bodies concerned with the administration of hearing defects. For instance, the Acoustic Laboratory was Commonwealth controlled, and the rest of the agencies were State controlled. That resulted in much confusion and also stood in the way of getting things done effectively. One great difficulty she had found was in supplying hearing aids to the average public patient. The only way in which help could be provided was to refer the patients to the hospital almoner. For pensioners it was a great problem, and there appeared to be no solution unless the Government paid something.

With reference to testing, Dr. Littlejohn advocated that first no deafness should be typed until audiometry had been carried out both before and after Eustachian tube catheterization. A course of catheterization combined with injections of vitamin B was of great benefit. She herself had not been impressed by the peepshow. Children tended to smash it. It was better to use a loud speaker, and with it one could get a reliable reading from a child of four.

Dr. Littlejohn said that allergic deafness had not been mentioned by Dr. Henderson, but she felt that it was a true entity. She was not referring to deafness secondary to allergic rhinitis. The results seemed to justify the diagnosis of allergic deafness. She thought it was advisable to arrange with a firm to have trial of a hearing aid for one month before finally buying it. It was important that the patient should have reeducation with the aid in place. The bone-conduction type in her experience did have a place, particularly for patients with running ears or those who were very self-conscious.

Dr. Littlejohn expressed her disappointment that Dr. Henderson did not start his treatment when the patient was a baby. She then went on to describe how for the first four months of life the baby could recognize his mother by sight, touch and smell. At six months he could vocalize with repetitive patterns, but if his name was called he would not respond. It should be possible at this age to suspect deafness, if present. It was easier still at eight months and very easy at twelve months. The child learned to comprehend by the gestures of his parents. If deafness was suspected at six or eight months treatment should be started immediately, the parents referred to a speech therapist and lip reading begun. At two years if the child was silent it would be increasingly difficult to produce a voice, and if the voice was produced, it would be a characteristic monotone. The deaf child should be fitted with an aid at the earliest age and taught to associate sound with its source. The hearing aid should not be worn all day, but for an hour at a time, and then a period of lip reading should follow. With reference to hereditary otosclerosis, Dr. Littlejohn advised young women who consulted her to get married, have two children and then stop. She was of the opinion that otosclerosis was inherited only indirectly.

It was a source of great comfort to old people to provide such aids as a low-tone buzzer for the door and a light buzzer for the telephone. The Postmaster General's department would fit the latter for a small charge.

H. H. R. NASH (Western Australia) said that he had been conscious of an allergic factor in deafness for many

years, and had started to investigate patients along that line and particularly those for fenestration. To his surprise he had found that all the latter showed evidence of allergy after operation; if they did not follow the anti-allergic regime, their hearing tended to deteriorate.

A. RICHARDSON (Victoria) thought that ear, nose and throat surgeons were somewhat to blame for some of the poor advice about hearing aids. The public should be protected by their seeing that the aids were properly approved.

D. G. CARRUTHERS (New South Wales) said he had not found much use for irradiation. The lymphoid hyperplasia he often thought was due to something else. With regard to hearing aids, he advised patients to practise with a friend, and if they missed a particular word they should practise over and over again. The doctor should help in the instruction of the patient. Those with nerve deafness could use their aids for special occasions until their own peculiar tolerance was found. He did not think that deafness resulting from noise in industry was very common. In New South Wales the problem of the deaf child was being conscientiously tackled, and a special ear, nose and throat committee was shortly to produce a report.

S. SUGGITT (Queensland) considered it a pity to underestimate acoustic trauma. It was one form of preventable deafness. Ear plugs could be worn in the same way as goggles when welding or a mask when sandblasting.

E. P. BLASHEKI (New South Wales) said he was delighted to hear the emphasis placed on the education of the parents of the children. He, too, was a keen advocate of Eustachian tube catheterization, and urged the use of the bougie also. He wished to join issue with Dr. Carruthers about the use of radon. In his hands it had been of great use for recurrent otitis in children.

R. H. VON DER BORCH (South Australia) found with radon that he could not be sure that it was in the right area and consequently had gone across to X-ray treatment. It was easier to administer.

Another speaker remarked that Professor Windeyer in London was using X rays and getting better results.

R. V. BLAUBAUM (Victoria) had had experience with X rays in 25 or 30 cases, and had been impressed with the gain in hearing.

N. M. CUTHBERT (Western Australia) uttered a warning against the promiscuous use of radon. He used it only when all else had failed.

Dr. Henderson, in reply, said that he could not convince himself of the existence of allergic deafness in the absence of allergy in the nose. Referring to the education of those with hearing aids, he said that the problem was that there were so few people capable of doing it properly. In his experience there were very few cases in which a bone-conduction aid would give a better result than an air conduction aid. Three years was the earliest age for a hearing aid. When speaking of hereditary deafness, he was not referring to otosclerosis at all, but to the congenital nerve type. He too used radium only as an absolute last resort. He used it too for occipital adenitis. Referring to occupational deafness, he said he found that deafness coming on from ten to fifteen years after ceasing work was often due to presbycusis.

Infection of the Maxilla in Relation to Maxillary Sinusitis.

W. E. FLEMING (Victoria), discussing maxillary sinusitis, said that estimation of the role of infection of the maxilla due to septic teeth and other sources in the causation of maxillary sinusitis had varied greatly in the past fifty years. In the early part of the present century many writers had expressed the opinion that that type of infection was the major cause of maxillary sinusitis, whereas modern writers gave it little prominence, sometimes not even mentioning it at all.

Dr. Fleming said that, believing from clinical observation that the pendulum had swung too far, he had undertaken a histological study of antral mucosa obtained from

a number of patients with clinical and/or radiographic evidence of infection of the jaw in the neighbourhood of the antrum; 32 subjects had been examined. In about half of them there were clinical signs and symptoms of sinusitis; in the remainder sinus symptoms were either slight or absent. In every case a diseased antrum lining was found, and in many of them gross changes were found; the predominating pathological type was the sclerotic or fibrotic.

Dr. Fleming went on to say that the diagnosis in such cases was not always easy. It had to include both a careful clinical inspection and good skiagrams of the upper jaw. In many cases the jaw was edentulous and the infection was of the nature of residual osteitis. Intra-oral films were essential; many infections would be missed if only antero-posterior or lateral head skiagrams were taken.

Dr. Fleming finally stressed the need for the cooperation of the dental profession in the prevention and eradication of such infections, and discussed the management of such patients from the ear, nose and throat surgeon's point of view.

F. SHANASY (Victoria) said that Dr. Fleming had taken his audience into the No Man's Land between dentistry and medicine. The sequence of dental and then antral infection was important. It was important to the dentist because he had fallen into a trap which had been sprung years before. It next concerned the ear, nose and throat surgeon who had to come later. It was his duty to explain the position to the patient and show that it was not really the fault of the dentist. As far as fistulae were concerned, he strongly held the view that a counter-opening must be made in the nose.

N. M. CUTHBERT (Western Australia) inquired whether Dr. Fleming had had experience of osteomyelitis in children. He (Dr. Cuthbert) was of the opinion that the primary cause was dental, and not ethmoiditis, as was sometimes said.

Dr. Fleming, in reply, said that he did not think it necessary to carry out such radical surgical treatment for fistulae as Dr. Shanasy advised. His experience with osteomyelitis in children extended to one case only. In that case all the teeth were shed, but the patient made a good recovery.

A Statistical Survey of Antihistaminic Drugs.

R. H. O. DONALD (Victoria) presented a statistical survey of antihistaminic drugs. He said that six antihistaminic drugs and a placebo had been subjected to a comparative clinical trial and statistical investigation at the Allergy Clinic of the Royal Melbourne Hospital; assistance had been given by members of the Department of Statistics of the University of Melbourne. The drugs in the trial were "Perazyl" (or "Di-Parolene"), "Benadryl", "Anthisan", "Neohetramine", "Thephorin" and "Antistine". The placebo was calcium carbonate. The experiment was designed so that (a) all the drugs, including the inert control, were in use at any given time, (b) there was a continuous series of controls, and (c) each patient received all but one of the drugs. The method was recorded in some detail, because it was considered that it afforded a more satisfactory basis for a comparison of results than the usual method, whereby each group of patients received one drug and a placebo. One hundred patients taken at random from the allergy clinic had been divided on clinical grounds into groups with the following diseases: (i) seasonal hay fever, (ii) seasonal hay fever and seasonal asthma, (iii) perennial hay fever, (iv) perennial hay fever and perennial asthma, (v) perennial asthma. The experiment was carried out over three months from October, 1951, to January, 1952. Eighty-six patients completed the experiment. "Perazyl" (or "Di-Parolene"), "Benadryl" and "Anthisan", in that order, were clearly more effective than the inert substance, and "Perazyl" appeared significantly more effective than one of the less effective antihistaminics. The remaining drugs, "Neohetramine", "Thephorin" and "Antistine", undoubtedly produced clinically significant improvement in a propor-

tion of cases, but it was insufficient, over the whole experiment, to be statistically significant. Toxicity must influence the physician's choice of drug, and in that regard "Perazyl" and "Nehetramine" appeared least likely to produce side-effects.

BRYAN GANDEVIA (Victoria), in opening the discussion, said that he would draw attention primarily to the method that was adopted and only secondarily to the results obtained; with those Dr. Donald had dealt. The vital importance of the statistical method of approach to clinical investigation was now well recognized, and any investigation into the value of any form of therapy was worse than useless unless such an approach was used. There might be occasional exceptions when there was a definite, inevitable and objective end-point to serve as an index of efficacy; but he believed that such exceptions merely emphasized the general truth of the dogmatic statement he had made. That should serve to encourage the physician rather than fill him with nameless dread, for he need have no more than a smattering of the principles involved; the experiment was planned for him by an expert and the results amply repaid the small amount of additional organization necessary. Such had been the case with the present investigation. The Youden Square arrangement finally adopted had not previously been used in the assessment of the antihistamines, but it possessed certain definite advantages. First, it ensured a continuous series of controls throughout the period of the experiment, thus facilitating the elimination of weather and seasonal variations. The control and test groups were obviously comparable, since in point of fact they were identical. Secondly, it permitted the assessment of an individual drug in two ways, both of which were of clinical significance. It might be assessed in terms of the proportion of patients obtaining benefit, or alternatively, in terms of the degree of benefit produced over the whole group of patients tested relative to the group of patients receiving the placebo. Obviously, for routine use the clinician would wish to use a drug which was moderately effective in a large proportion of cases rather than one which was 100% effective in 10% of cases, although that drug also had its place. Finally, the design made it possible to stop the experiment at the end of either eight or twelve weeks if, for example, it was considered that the hay fever season had come to an end. The experiment would have been in part a failure if certain lessons had not been learnt as a result of it. Dr. Gandevia said that if it was to be repeated, he would regard the following features as essential. The patients should be trained to study their own progress and record their observations in as objective a fashion as possible. Many of their patients were now well trained, and he was sure that their estimates of the number of attacks were consistent and reliable. It might be said that experience in assessment in accordance with the design of the experiment was required of both examiner

and patient. The "pseudonym" for each drug should be changed at frequent intervals so that there was no possibility that the assessors might form an opinion of any one drug during the period of the trial. The value of an independent assessor, otherwise quite unconnected with the experiment, was demonstrated. He performed the tedious task of questioning the patients less frequently, could not become even faintly familiar with the false names as he did not ever see them, and could not be influenced by the patients' previous experience.

Dr. Gandevia went on to say that they had hoped to be able to give a separate analysis for the seasonal and the perennial hay fever groups, but that proved impossible owing to the fact that their optimistic estimate of 80% improvement in 80% of cases was not justified. The analysis was open to criticism on the grounds that there was no clinical justification for grouping together the seasonal and the perennial types of hay fever and asthma. Whether that was a reasonable criticism was perhaps a matter of one's opinion on the aetiology of the diseases in question; but at least there was no statistically significant difference between the two types with regard to their response to treatment. If there had been, such grouping would not have been permissible. One practical point which time had not permitted Dr. Donald to discuss was that of dosage. They had used the standard dosage recommended by the manufacturers, but if improvement was minimal or absent they did not hesitate to increase it in the absence of significant toxic effects. It was worth remembering that "Perazyl" was slow to act and could not therefore be recommended to abort an incipient attack; the duration of its effect was said to be longer than that of other antihistamines. Finally Dr. Gandevia referred to the patients' point of view, which, paradoxically enough, seemed to have received little consideration. At the conclusion of the trial, a number of patients were given their choice of tablet for future use. One-third decided on "Perazyl" and one-third on "Benadryl", and one-third were divided among other antihistamines. In the close agreement between the patients' conclusions and their own was contained a glorious vindication of the scientific approach.

C. SUTHERLAND (Victoria) said that one often had a suspicion that the sedative action of antihistamine preparations might have been responsible for the relief of symptoms. He therefore urged the use of an ordinary sedative as a control in any future experiments.

Dr. Donald, in reply, said that it was difficult to give an idea of the enormous amount of work involved. Approximately 500 pages had to be analysed so as to produce the statistical tables. One big problem was to get patients to report results accurately. A great help in that respect was to have clinicians with much experience. He thought Dr. Sutherland's suggestion about a sedative was a good idea.

Section of Public Health, Industrial Medicine, Tropical Medicine and Aviation Medicine.¹

President: E. H. Derrick, M.D., B.S., F.R.A.C.P., Queensland.

Vice-Presidents: H. K. Fry, D.S.O., M.D., B.S., D.P.H., F.R.A.C.P., South Australia; Frank R. Kerr, D.S.O., M.D., B.S., D.P.H., Victoria; Professor A. H. Baldwin, M.B., B.S., D.P.H., D.T.M. and H., F.R.A.C.P., New South Wales; L. Henzell, M.D., B.S., D.P.H., Western Australia.

Honorary Secretary: R. J. Farnbach, M.B., B.S., D.P.H., Victoria.

President's Address.

E. H. DERRICK (Queensland) in his president's address reviewed the epidemiology of "Q" fever and attempted to clarify the methods by which *Coxiella burnetii* was transferred from its natural reservoirs to cause infection in man. He said that the important sources of *Coxiella*

burnetii in regard to human infection were cows, sheep and goats. In those animals, when they were infected, the organism was found particularly in placenta and milk. Many species of ticks had also been found naturally infected, but they were unimportant as a source of human infection. The association of "Q" fever patients with the animals from which they were presumably infected showed all degrees of closeness. Some patients were occupationally in immediate contact with animals. Some resided near by. Infection had occasionally been carried on clothing, and

¹ The meeting held by the Section of Public Health, Industrial Medicine, Tropical Medicine and Aviation Medicine with the Section of Pathology, Bacteriology, Biochemistry, Experimental Medicine and Forensic Medicine has been recorded.

very often in dust. Sometimes the association with animals was remote, but traceable. In some outbreaks no association at all could be discovered. The high resistance of *Coxiella burnetii* to heat and desiccation allowed contaminated material to retain its infectivity for long periods, during which it might be transported to a distance. Inhalation was in the great majority of cases the mode of entry of *Coxiella burnetii* into man. A small but definite group appeared to be due to the ingestion of raw milk. Occasional examples of other portals of entry might be found by searching the world literature. Dr. Derrick concluded by saying that the still unsolved problems of "Q" fever—particularly that of prevention—presented a challenge to the investigator.

SIR MACFARLANE BURNET (Victoria), opening the discussion, said that he was impressed by the fact that the epidemiological picture had changed a great deal since 1937, and felt that the rickettsia was in a stage of evolution which was going in more than one direction. In all questions of epidemiology one asked how the parasite survived in Nature. The human infection was only an incident. The "Q" fever parasite appeared to have two totally distinct ways of survival—one like the classical pattern, in which it survived in the tick and such hosts as the bandicoot, and another in which it had a life history similar to that of *Brucella abortus* (with the possible exception that no growth occurred in any medium outside the body). Sir Macfarlane Burnet was interested in the isolation of rickettsial parasites from pigeons. He said that "Q" fever resembled psittacosis in its ready infection of man by inhalation and the only occasional instance of man-to-man infection. In man-to-man infection there was a rare but striking infection from patient to, say, medical attendants. It might be found that this versatile parasite would develop into a man-to-man transmissible parasite. In infections of normal virulence at the present time man-to-man infection occurred only with very ill patients when the concentration of the parasites in the lungs was very high. In conclusion he said that it was almost an honour to have such a versatile parasite named after him.

E. V. KEOGH (Victoria) said that surely the session was unique in that the paper was read by the discoverer of the disease and the discussion was opened by the discoverer of the cause of the disease.

D. GORDON (Queensland) said that in his State the attacks seemed to affect people associated with the slaughter of cattle rather than farmers. That was surprising in view of the fact that in meatworks the floors were swilled down and the cattle went through a shower before going into the slaughterhouse—hence there was not very much dust in the meatworks. Another strange thing was that there was not more infection in the families of workers associated with these industries. On the other hand, the drafting of cattle and sheep was a dusty occupation. On dairy farms, dust, manure and contaminated milk, and the contamination of the calf's hide were all factors which would appear to favour the dissemination of the disease.

J. A. R. MILES (South Australia) said that all the cases they had investigated appeared to be in the beef hall in the slaughteryards. In one such epidemic they were under the impression that cattle from Queensland were the source of infection. Dr. Derrick, however, had pointed out that the Queensland cattle that had been suspected did not come from an endemic area. Dr. Miles went on to say that they had collected sera from apparently normal humans from various parts of the State of South Australia. Up to the present there were no positive serological results, although they were certain that there were some endemic areas in the State, possibly in the Adelaide Hills or in the south-east. Dr. Miles said that in a village in North Kent, England, where there was an epidemic, a high proportion of "positive" sera was found in a few streets in that particular village, and nowhere else. Those few streets were in close proximity to a rendering plant, which was also making bone-meal fertilizer, and there were rotting carcasses lying about. He added that little had been done in that case because of political repercussions.

A. H. BALDWIN (New South Wales) said that in view of the importance attached to inhalation as a method of transmitting the disease, he wished to ask whether there was any evidence which would incriminate milk processing. The processing of milk was done by two methods—one by heat and the other by powdering—and he felt that possibly the method of powdering might favour the inhalation method of spread. He asked if any method of investigation had shown that there was an increased danger to people handling milk, cream or dried milk, and if there was any danger of the disease being transmitted by condensed milk or by cream distributed in bulk.

W. J. STEVENSON (Victoria) said that he had recently spent three months in California and had been very interested in the investigation of the epidemic which had occurred on the ship bound for Okinawa, carrying goats. It had been found that the crew, in spite of instructions to the contrary, had consumed raw goat's milk and had also played with the goats—those were two possible methods of infection of the crew. In another epidemic which had occurred in a country town in the United States of America there had been a high proportion of males infected; that seemed difficult to explain, as there was no obvious reason why the females in the community should enjoy any special immunity. He had had a telephone message that morning from Dr. O'Connor, who had said that there were 16 positive agglutination test results for "Q" fever in a batch of sera submitted from workers in the slaughtering industry who were being investigated for the incidence of *Brucella*.

A. R. SOUTHWOOD (South Australia) asked if there was any real danger of clinicians missing cases of "Q" fever. In view of what had been said at the meeting it appeared that the incidence of "Q" fever might not be confined to workers in the slaughtering and allied industries.

Dr. Derrick, in reply to Dr. Gordon, said that there was no explanation for the higher incidence in slaughterhouses as compared with other apparently more likely sources of infection. In some of their surveys in Queensland they had discarded sheep as of no importance, as their investigations had been firstly in cattle-raising areas where there were no sheep. He pointed out that in Los Angeles the close confinement of cattle must play a large part in the dissemination of the disease. Many of the anomalies would be explained if it was found that some cattle excreted the rickettsia in the faeces. Calves fed on infected milk might excrete the organism in their faeces for a short time. The Greek investigation had been done at a time when attention was concentrated on the sputum. It had been suggested that the rickettsia in Greece should be called *Rickettsia burnetii* subspecies *caproni*.

In reply to Professor Baldwin, he said that creamery workers had been found to have antibodies present in their blood in a higher proportion than in the general population. The method of spread might possibly be by contact, and possibly by inhalation, but it was as yet unexplained. It had been found that butter made from infected cream was still infected after forty days; this butter had been unpasteurized but had been refrigerated after manufacture.

In reply to Dr. Stevenson he said that the infection in America had been traced to cattle ranches in the hills; visitors coming into the town had brought the infection in, the cases being mostly among those who worked in the centre of the town. With regard to the pasteurization of milk, he felt that if the milk was heavily infected a slightly greater degree of heat was necessary to effect successful pasteurization, but in general with moderately infected milk the normal method was satisfactory.

In reply to Dr. Southwood he said that it was quite likely that cases were missed. A recent survey of the coastal areas of Queensland had brought to light six cases, but the likelihood of missing cases in epidemics was less.

The Epidemiology and Control of Leprosy.

C. E. COOK (Canberra) read a paper entitled "Lessons in the Epidemiology and Control of Leprosy to be Learned from Australian Experience". He said that recent advances in leprosy therapy and new concepts of epidemiology had

revived the agitation for relaxation of the strict measures of prophylaxis applied in Australia, and three arguments had been adduced: (i) The sulphones readily controlled and certainly cured clinical manifestations; it was suggested that complete eradication of infection could be achieved solely by drug therapy and prophylaxis. (ii) Europeans enjoyed a high inherited resistance conferred by a hypothetical natural selection effected during the epidemics of the Middle Ages; the infectivity of leprosy was so low that it could never attain an incidence in man comparable with that of tuberculosis. (iii) Infection took place only in infancy and childhood, and segregation of persons with open lesions from children was the only prophylactic measure required. Dr. Cook said that the weight of the arguments had to be dispassionately evaluated before they were permitted to influence responsible opinion. (i) With regard to the value of the sulphones, Carville workers, after a five years' review of sulphone therapy, stated that they had a cure rate of 55% among persons who had discontinued treatment. In 1925 Rogers and Muir stated that they had a cure rate of 55-5% for the chaulmoogrates. (ii) Referring to racial resistance, Dr. Cook said that Australian experience supported no theory of special European resistance. In the Northern Territory formerly the incidence of leprosy amongst whites at risk in the endemic areas was estimated at 20 per thousand, one of the highest rates recorded anywhere. Tuberculosis, introduced into northern Australia at the same time as leprosy, had attained amongst natives there an incidence of less than five per thousand. By contrast, the incidence of leprosy was 56 per thousand. (iii) Turning to the age of infection, Dr. Cook said that in many Australian Europeans the age of infection could be determined with reasonable accuracy. In New South Wales the average age lay between twenty and twenty-five years, and in Queensland it approximated thirty years. Leprosy, introduced to the native population of the north about 1890, continued sporadically as a disease of adults in a restricted tribal area for nearly three decades. With the concentration of native children on missions, the attendant demolition of intertribal barriers, the uncontrolled herding of the infected and the susceptible under unhygienic conditions, and the debilitation of the natives by imported infections and defective diet, leprosy in aborigines had increased in incidence alarmingly and had become largely a disease of children and adolescents. In Australia leprosy would probably have been much more prevalent but for the measures of control applied with more or less efficiency since 1890, and to abandon them would not be without danger.

A. FRYBERG (Queensland) said that Dr. Cook had made out a strong case for segregation and that he was inclined to support it. Only a handful of patients suffered from Hansen's disease, and if they were kept in isolation until they gave negative results from smear examination the incidence of the disease would be greatly reduced. With regard to the sulphones he was not as pessimistic as Dr. Cook. When sulphatone was given by mouth and by injection at Phantom Island the natives with acute manifestations of the disease responded well; in fact they responded better than whites. With regard to the relative incidence of leprosy and tuberculosis among natives, a survey that Dr. Wunderly and Dr. Mackerras had carried out with him amongst the mission stations and Government areas in Queensland had brought to light only one case of leprosy in an old man, and his was a well-established case. It had to be realized that in all Queensland there were very few wandering natives, and probably for that reason there was a lower incidence of leprosy in Queensland than in the Northern Territory. He felt that susceptibility to leprosy was an inherited tendency. Children should be removed from infected parents at birth. The familial incidence of the disease supported that view. If the child was not removed at birth he stood a good chance of developing leprosy later.

E. V. KEOGH (Victoria) said that he had doubts about the somewhat paradoxical view of Dr. Cook of the equal infectivity of tuberculosis and leprosy. Segregation was effective in both diseases because neither was very infectious. This he contrasted with scarlet fever, which was

highly infectious and in which segregation played no part in diminishing the incidence of the disease. It was hard to measure infectivity, but it was necessary to have some idea of what was happening in the disease. At present, when tuberculosis was a disappearing disease, it took two cases of clinical tuberculosis to produce one new case. Dr. Keogh considered that leprosy was even less infectious. Leprosy had practically disappeared from civilized communities. A rise in the standard of living was a much more valuable basis for the elimination of leprosy than segregation.

E. F. MACKENZIE (Victoria) said that recently a liver biopsy had shown *Mycobacterium lepræ* in a case in which the skin manifestations were early and slight. He wondered if there was a septicæmic phase.

H. K. FRY (South Australia) referred to the method of isolation in older communities by the use of some sound warning such as the clapper. He wondered whether natives who were subject to ideas of avoidance and also capable of being influenced by the older men of their tribes could be trained to use such methods and thereby eliminate the need for separating them from their own areas. The natives themselves disliked removal to a leprosarium and tended to "go bush" and avoid detection and apprehension. He referred briefly to rat leprosy, which was a mild form of the disease, discovered occasionally in rats captured in cities.

Dr. Cook, in reply to Dr. Fryberg, said that he did not intend to suggest that the authorities at Carville opposed segregation. His point was that they claimed a 55% cure rate, which was identical with the cure rate claimed by Rogers and Muir in 1925, when they were using chaulmoogrates. He did not think that the use of sulphones was the answer to the elimination of the disease from the community.

In reply to Dr. Keogh, he agreed that the improvement of the standard of living was a potent explanation of the reduction in the incidence of leprosy. He wished to point out, however, that leprosy in the tribe had very little hold on natives while they maintained their tribal life. It was only when their living conditions and nutrition were "improved" in mission or government settlement that the incidence rose to 56 per thousand, and those figures were probably incomplete. This was the highest incidence in any country in the world. He felt that the method suggested by Dr. Fry was not applicable, because the old men's influence disappeared when the natives were transferred to mission or government settlement, and the very time when that authority might be of use was the time when it was not available. He thought that the factors in the propagation of the disease were in part created by the herding of the natives together and their living on a debilitating diet.

Lead Hazard in the Aviation Industry.

F. S. PARLE (New South Wales), discussing the lead hazard in the aviation industry, said that in 1924 tetra-ethyl lead had first been used on a large scale in the United States of America for improving the efficiency of automobile engines. It was added to petrol in a concentration of one part in 1300. From the beginning it was realized that that compound of lead was most toxic. Kehoe and the United States Public Health Service carried out an intensive investigation of all aspects of the use of the substance in leaded petrol, showing that there was no danger in using that type of fuel. In the aviation industry the use of leaded petrol had paralleled its use in the automobile, although the tetra-ethyl lead was in a higher concentration. Dr. Parle said that his paper would deal with a preliminary investigation of a hazard arising from the deposition of lead salts on various parts of an aircraft engine and adjacent areas of wing. The deposit consisted of oxides and bromides of lead fused together on metal. The hazard arose during cleaning operations to remove the deposit. The wing was cleaned by being wiped with a cloth moistened with white spirit. Engine parts, such as pistons, valves, spark plugs, cylinders and exhaust pipes, were cleaned by being grain-blasted or sand-blasted.

Repairs carried out on exhaust pipes with an oxy-welding torch gave rise to a hazard due to volatilization of lead from deposits on the interior surface. The hazard was checked by estimation of lead in the urine of employees doing that work. Normal figures were taken as 0.120 to 0.08 milligramme per litre. Investigations were made on one sample and results were corrected by the method of Levine and Fahy where applicable. The analysis was made by the diphenylthiocarbazone method, and the work was carried out by the Defence Research Laboratories, Melbourne. No cases of lead intoxication were detected. It was considered that the work processes should be carefully supervised to control the hazard.

E. H. ANDERSON (Victoria) asked whether the battery repair in the aviation industry added materially to the lead hazard.

Dr. Parle, in reply, said that he had done no work on the lead content of the urine in the workers concerned, but that no doubt it was one form of the lead hazard. The matter had been already investigated and proper precautionary measures laid down. In reply to a question on the danger of leaded fuel in the community in general, Dr. Parle pointed out that Australian aviation petrol contained the highest proportion of tetra-ethyl lead in the world, over five cubic centimetres to a gallon being used. The purpose of the paper was to draw attention to the lead hazard which did exist.

D. GORDON (Queensland) expressed doubt about the accuracy of lead estimations in the urine on a single specimen. He thought that the correction factor for specific gravity gave readings that were rather too high. He himself used twenty-four hour specimens and had no difficulty in arranging their collection.

Dr. Parle agreed with Dr. Gordon concerning the inherent fallacies in the technique, but drew attention to others, such as contamination of the specimen by dust from clothing.

D. O. SHIELDS (Victoria) asked whether blood examinations had been made on the workers.

Dr. Parle, in reply, said that they had investigated the blood of the workers most heavily exposed over a period of a year and had found it to be normal. They had therefore not examined the others. Considerations of expense were also involved.

Human Engineering: A New Technology.

J. C. LANE (Victoria) read a paper on the subject of human engineering. He said that when an engineer set out to design a communication or control system he needed precise information about the performance characteristics of its electronic and mechanical elements. Often such systems had human operators as links; the designer therefore needed also to know the characteristics of the human operators. Recent theoretical developments permitted the consideration of control and communication systems whether they were mechanical or electrical, or whether they occurred in the nervous or endocrine system of animals. Since it was difficult to modify a man's operating characteristics, it was more practical to design equipment so that its points of interaction with the operator were matched to man's capacities. Human engineering was a blend of various biological sciences—physiology, anatomy and physical anthropology, but especially applied experimental psychology, together with various branches of engineering, particularly electronics. It aimed to determine human capacities, to provide principles governing the design of machines for efficient human use, and to ensure an effective integration of man and machines for the accomplishment of a task. Though one of its objectives was to provide the data which would permit engineers to design equipment adapted for efficient human use, another was to help engineers to decide which parts of a particular job were best performed by machines and which by men. Machines were superior to men in speed and power, in their immunity to boredom and inattention, in computation, in short-term memory work, and in their ability to carry out simultaneously more than one activity requiring

some degree of attention. Human operators were superior in tasks depending on the functions of hearing and vision, in their ability to grasp complex situations quickly, in their ability to improvise (an insurance against breakdown of a system in emergencies), and in ability to store and select large amounts of information and to reason inductively. Dr. Lane discussed in detail the application of human engineering to aviation and to various branches of industry. He said that if Australian aviation, military services and industry were to catch up with and then keep abreast of overseas advances, four objectives must be realized: (i) Engineers must give up their intuitive attitude towards human operators, and accept the fact that human performance could be reliably measured by means of the proven methods of experimental psychology. (ii) The existing information must become readily accessible to them. (iii) Psychologists and other biologists with knowledge in that field must be available to act as consultants to designers. (iv) To ensure that psychologists and others became skilled in human engineering, and to provide a means of settling new problems by experiment, universities or technical institutions must be provided with funds from the services or other government sources in order to set up human engineering laboratories.

R. D. WRIGHT (Victoria) opened the discussion. He said that the problem in human engineering in Australia was not one of physiology or psychology, but one of trade organization. Australia was an importing country. The essence of the importing industry was to buy cheaply and sell dearly. This created a trend towards out-of-date models. Any local activity in the direction of human engineering design was not in the interests of the importers. In the second place, a great variety of goods was imported, each with its own imperfections. A pilot therefore might have to use six or seven different machines, each partly worn, so that the human operator would be faced with the necessity of making many compensating adjustments, both for the design and for the wear. He quoted one case in which apparently consideration of anthropometric measurements had produced an ideal design in railway carriage seats in New South Wales. However, the weight of the human body and the fact that the seats were sprung had been forgotten, the design being thus nullified. It was essential to remember quite ordinary things, such as the labour which required more force than the average human could produce, or machines which required discriminatory movements which were beyond the average capacity. The fact that some exceptionally strong wharf labourers could shift a 400-pound package did not mean that all wharf labourers could do so. Sometimes a simple test could do more than the finest machine. The finger-nail could detect a crack in a polished surface down to 3 μ . A study of workshop method might show that experienced workers could use trick methods which might be taught to other workers by appropriate training methods. He had little faith in the future of human engineering in Australia; 90% of the manufacturing processes were carried out under licence, and the ideas of a hair-brained professor stood little chance of being accepted. During the war he had advised the adoption of red lighting in Australian aircraft six months before Professor Best had persuaded the Canadian Navy to adopt it. He thought that in many cases a study of the physiology of mechanisms in the human body would give the designing engineer ideas which might be useful in industry, such as the breech-block mechanism of an automatic gun, which used the same principle as one found in the human lower jaw.

D. GORDON (Queensland) also expressed pessimism about the adoption of the principles of human engineering in Australia. He said that Professor Shaw was doing research into those problems, and as far as he knew his was the only laboratory in Australia carrying out that type of work.

SQUADRON-LEADER SHARP asked whether Dr. Lane shared Professor Wright's idea of the lack of cooperation between doctors and engineers.

Dr. Lane, in reply, said that there were two problems. In aviation in the services there was good liaison between the medical side and the designer. In civil aviation the

position was less satisfactory. The "Bristol 175" was the only aircraft in which there was evidence that human engineering data had been used in layout. He agreed that in Australia nothing was going on except the small-scale investigation in Queensland. There was, however, the necessity for constant planning for ground facilities, as those were being rapidly expanded.

AIR-COMMODORE ARMSTRONG pointed out that the introduction of red lighting in Beauforts during the war had been a failure, because the maps supplied to the air crew were printed in red and therefore invisible under red light. There was a need for international standardization. One could not be parochial. From the engineering aspect one had to think of the allocation of manpower, a vital factor in any future war. That would be distributed over four aspects in aviation: production, training, operations and maintenance. Simplification for the operator might be costly in those terms, if maintenance or production made disproportionately large demands on the manpower pool. He expressed resentment at the medical man's point of view as he saw it—"what he said must go". He thought that the two professions should work in close harmony.

Dr. Lane, in reply, agreed that the overall picture must be correlated in terms of manpower, but drew attention to the possibilities of large economies in training time. He sighted the North code as an inefficient encoding technique which was learnt by the average person slowly and with difficulty.

Problems in Immunization Against Whooping-Cough.

STEPHEN FISHER (Victoria) discussed immunization against whooping-cough. He said that occasional deaths of babies, distress caused by the disease and the possibility of subsequent permanent pulmonary changes justified attempts at immunization. In two recent trials abroad, immunization had decreased the incidence of clinical pertussis fourfold, and lowered its severity. Available prophylactics varied considerably in protective efficiency; assay and field trial results were not closely correlated. Satisfactory assay method and identification of essential immunizing bacterial components were necessary for progress. Suitability of assay depended largely on the type of experimental disease induced in immunized animals, usually mice. The American method of intracerebral challenge was technically satisfactory, but the ensuing encephalitis was unlike human disease. The intranasal challenge, used in Australia, led to specific pneumonia, but was somewhat difficult to apply. Workers at the Commonwealth Serum Laboratories, Melbourne, had recently discovered that cultures of virulent pertussis organisms agglutinated suspensions of washed erythrocytes. The active principle, hæmagglutinin, had been extracted and purified. The final product, hæmagglutinin, aluminium phosphate adsorbed (HAPA), was stable and accurately standardized. Mice immunized with HAPA showed good protection against intranasal challenge and some against intracerebral challenge. The course advised for children, two doses of 0.25 millilitre, injected subcutaneously one to two months apart, caused rather mild toxic reactions; over 1000 cases had been observed. Among 277 babies immunized with HAPA in the city of Melbourne baby health centres during 1951, one unproven case of pertussis occurred, compared with ten established and seven doubtful cases among 760 unimmunized controls in the same area. Those figures suggested that protection was conferred by HAPA; however, proof of its protective efficiency was lacking in the absence of a fully controlled field trial. Dr. Fisher finally discussed the risks attending pertussis immunization.

E. V. KEOGH (Victoria), who opened the discussion, said that the provision of a good prophylactic against whooping-cough was not easy. Despite research they had not yet the complete answer. The present agents were used widely. A survey showed that 60% of children had been immunized before the age of two years. In his opinion clinical experience regarding whooping-cough prophylaxis was of value, but might not be acceptable to statisticians. Vaccine required fortified injections. That was an objection to it,

and a reason for seeking a better agent. He opposed the use of combined prophylactic agents. In his opinion hæmagglutinins would be efficient if given a fair trial.

G. R. WEIGALL (Victoria) asked several questions. The first referred to age; he wondered whether the duration of immunity was as long for the child immunized at the age of three months as at six to nine months. He himself considered pertussis vaccine effective, and he had seen no cases of whooping-cough in children so immunized. The second question was whether there was any risk of encephalopathy. The third question was whether there was any risk of poliomyelitis following pertussis vaccination. The fourth was whether there was any objection to giving both pertussis and diphtheria prophylactic injections in the same deltoid muscle at the same time with different syringes.

J. COLEBATCH (Victoria) said that the use of hæmagglutinin and diphtheria prophylactic combined had been valuable in his experience.

S. WILLIAMS (Victoria) thought that not the number of injections, but the lack of reactions, was a factor in successful vaccinations. Children would not come back to complete the course if they had a severe reaction.

H. K. FRY (South Australia) said that he had been using for the past three years four injections of vaccine given simultaneously with three diphtheria injections. He had not heard of a case of poliomyelitis following that technique. One should be careful to avoid crowded rooms when immunizing. In Adelaide last year there were only three cases of whooping-cough. One of those patients had not been immunized.

Dr. Fisher, in reply, said that he did not know whether the duration of immunity in the younger children was lasting; but young infants gave a good antibody response in the blood. There was no way to assess the risk of encephalopathy, but the incidence was very low. Pertussis vaccine was not the only agent which preceded poliomyelitis. When diphtheria and whooping-cough injections were given in the same syringe there was a boosting of the effect of the diphtheria compound and suppression of the whooping-cough. A combination of PTAP and hæmagglutinin was feasible; it was not possible to be certain of the pertussis component. The time of immunization for the period should be five or six months. With regard to the incidence of whooping-cough, there had been many cases in Melbourne in 1947-1948, but not many since.

Diarrhoea.

A symposium was held on the subject of diarrhoea.

V. L. COLLINS (Victoria), discussing clinical aspects of infective diarrhoea, said that in most cases the diagnosis was clear, but in a minority the indications that a bowel infection was the cause of the patient's illness were absent or inadequate. That created a special problem in regard to the admission of patients to hospital and the spread of infection there. The problems presented by that group of patients were discussed. Dr. Collins said that over the past twelve months, 350 patients with enterocolitis had been admitted to the Children's Hospital, Melbourne; 56 had a *Shigella* infection, 51 a *Salmonella* infection and 243 non-specific infections. Though 75% of patients with *Shigella flexneri* infections and 30% of patients with *Shigella sonnei* infection had blood in the stool at some stage, it was the *sonnei* group which most often had an atypical onset. An onset with convulsions or meningitic features in the absence of diarrhoea was the commonest problem. Three patients with *Shigella sonnei* infection developed permanent cerebral damage with quadriplegia or hemiplegia following a series of convulsions. Of the *Salmonella* infections the majority were due to *Salmonella typhimurium*. In seven cases a convulsive seizure was the main feature at onset, and in eight others the onset at first did not suggest a bowel infection. There were three patients with high fever or meningitic features with clear cerebro-spinal fluid, one patient with *Salmonella osteomyelitis* and one with *Salmonella meningitis*; an unusual patient presented suffering from *Salmonella cervical*

adenitis with recurring suppuration over a period of fifteen months and persistent *Salmonella* septicaemia and positive stool culture findings over the same period.

Dr. Collins said that the diagnostic problem presented by such patients and the known infant carrier risk in *Salmonella* infection emphasized the need for barrier nursing of infants in hospital; but barrier nursing also raised a barrier against good mothering and adequate occupation of the infant in hospital—a problem which had to be faced.

S. ORMEROD (Victoria) read a paper on the isolation and identification of intestinal pathogens. He discussed the subject from the point of view of the way in which the laboratory worker could help the general practitioner and public health authorities in regard to the various aspects of infectious diarrhoea. He said that in individual cases the laboratory worker attempted the isolation and identification and an estimation of the drug sensitivity of pathogens from excreta, and in the case of continued fever, he carried out blood culture. When there had been an outbreak of such an illness, he could give further bacteriological assistance in the detection of the source, the vehicle of infection and the manner of spread. Dr. Ormerod gave an outline of the methods of examination for enteric pathogens used at the Public Health Laboratory of the University of Melbourne, stressing a number of points in the selection of specimens by the practitioner. He said that the best specimens available must be sent. In the selection of material from faeces, if mucus was present it should be sent. A rectal swab was useless unless it really was a swabbing of the rectal mucosa. Dr. Ormerod pointed out that, in spite of its limited application, microscopic examination of a fragment of mucus was an investigation immediately available to every practitioner, however isolated. Gram-negative organisms were susceptible to drying and to acid; as faeces rapidly became acid by bacterial action, they should be sent in a vehicle such as Sach's buffered glycerol saline. Dr. Ormerod described the techniques used in his laboratory, and mentioned some of the characteristics of the organisms generally isolated.

F. W. WILLIAMS (Victoria) said that at Cowes, Phillip Island, the study of seasonal diarrhoea had resulted in the knowledge that the chief cause of diarrhoea was the unclean handling of food and the presence of flies in the kitchens. Swabbing the bowel of affected persons failed to reveal organisms of the "diarrhoea" group, even though the inoculated broth was taken straight to the bacteriological laboratory. These facts pointed attention to the possibility of toxins resulting from germ contamination; toxins were often thermostable. It was found that chefs always used their fingers to arrange the food on the plates, that chefs' hands were rarely clean, and that hand towels in kitchens were always dirty. Flies were not uncommon in kitchens, chiefly owing to carelessness. It was concluded that it was unsafe to use food, particularly meats and custards, which had been cooked for over twelve hours, unless very efficient refrigeration was available. Dr. Williams said that in trying to suppress uncleanness and enforce sanitation, obstruction came from many sources—ignorance of simple hygiene, the relationship of many councillors to the culprits perpetrating offences and the sympathy the public had for those prosecuted, combined with their ready criticism of health authorities. Education of children, shire councillors and the general public in sanitation, and pride in cleanliness seemed to be the greatest weapons to combat the diarrhoea. The old army five "f's"—flies, fingers, faeces, filth, food—pointed out all the important teachings of sanitation, for undoubtedly the food was chiefly soiled by flies and fingers which had touched faeces or filth.

E. V. KEOGH (Victoria), who opened the discussion, said that Dr. Williams had shown what an energetic medical officer of health could do and also how interesting the problem could be when attacked by a local practitioner who was familiar with local conditions and personalities. He felt that much good would come if the Australian Broadcasting Commission could be persuaded to have Dr. Williams speak on its guest of honour session. The

problem of diarrhoea in adults was rather different from that in children. In adults it constituted an inconvenient upset on holiday, but it could also cause wastage and loss of working time. He wondered how far repeated attacks of minor ailments affected the general health and efficiency of human beings. It had been shown that the feeding of livestock with penicillin in their food improved their growth by the elimination of minor subclinical infections. It might well be that if the population of Melbourne could be freed of coughs, colds and diarrhoea they would be a happier community.

Dr. Keogh went on to say that in the case of babies Dr. Collins had shown how advances in therapeutics had decreased the mortality, so that now death was rare. Babies got the infection from adults. Dr. Fryberg at a previous session had demonstrated how the institutional spread amongst babies originated in adults. At Cowes diarrhoea was contracted by eating or drinking. The problem of proving the source at Cowes was not as difficult as in outbreaks in the city. There everybody rushed at the same time to sandwich bars and similar places, where food was prepared under the same bad conditions as Dr. Williams had shown existed at Cowes. Similarly in the evening they often crowded into bars to have drinks before going home. Under the conditions of stress and hurry, persons in such places might become careless even if their normal habits were cleanly. The conditions favoured the spread of diarrhoea. They then went home and transmitted the disease to their children. The epidemicity of intestinal upsets was therefore a penalty for a civilized method of living. Dr. Keogh cited the experience of Dr. Seagar, who while working with UNRRA made a journey from Peking to Lhasa. When asked whether as a pathologist he was not afraid of eating in inns on such a journey he said that the serving of food to a party was much better carried out there than at home. A cauldron of boiling water was first brought to the table and all the utensils were washed. The meal was then prepared.

Dr. Keogh said that the remedy for the present state of affairs surely lay in the education of the community. The higher standards which prevailed generally in the United States were relaxed a little during the war when there was shortage of manpower.

A. FRYBERG (Queensland) suggested that a quicker result might be achieved if a newspaper reporter and photographer were taken down to give the public an insight into the conditions of food preparation at a holiday resort. He thought that a double source of water supply, one source being polluted, was always a source of danger.

S. E. J. ROBERTSON (New South Wales) said that they had had a lot of trouble at the Royal Alexandra Hospital for Children with ward infections of *sonnei* type. It was their practice to take rectal swabs on three successive days, but often the results of examination of the first two were negative and of the third positive. By that time cross infection might already have appeared.

Dr. Keogh asked whether diarrhoea was confined to visitors at Cowes or did it also affect the local residents.

Dr. Fryberg said that he considered that swabbing of adults as well as of patients should be carried out; where that was done in Queensland there had been no outbreak of institutional diarrhoea.

Dr. Collins, in reply, said that *S. sonnei* was their major cause of cross infection in hospital. They had had seven cases of which three were due to one patient. A ward outbreak might develop quite suddenly, and most trouble was experienced at the beginning of the outbreak. By tightening up the control on older patients and grouping nurses to small numbers of patients, it was possible to limit spread. The investigation of sources of infection should ideally extend to the whole staff, including kitchen staff, but that was a big task.

Dr. Williams, in reply to Dr. Keogh, said that there were very few cases of diarrhoea amongst the local population at Cowes. The disease was practically confined to the visitors.

Post-Graduate Work.

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR NOVEMBER.

Ballarat Post-Graduate Lecture.

A POST-GRADUATE LECTURE will be given at Ballarat on November 6 at 8 p.m. by Dr. L. Lloyd-Green on "Sterility". Enrolments should be made with Dr. J. P. L. Griffiths, Honorary Secretary of the Ballarat Subdivision of the British Medical Association, 29 Errard Street North, Ballarat. Telephone: 350. The fee will be 10s. 6d.

Warrnambool Post-Graduate Course.

A post-graduate course will be held at Warrnambool on November 22 and 23. The programme is as follows:

November 22: Dr. H. B. Kay, "Medical Treatment of Hypertension"; Dr. S. F. Reid, "Disease of the Peripheral Vessels".

November 23: Professor L. Townsend, "Vaginal Discharge"; Dr. W. McL. Rose, "Lymphadenopathy".

The fee for this course is £2 2s., or 10s. 6d. per lecture, and enrolments should be made with Dr. W. R. Angus, Honorary Secretary, 214 Korot Street, Warrnambool.

Please note the alteration in date of the Warrnambool course from November 15 and 16 to November 22 and 23.

Lecture at Flinders Naval Depot.

On November 12, at 2.30 p.m., Dr. Keith Bottomley will lecture on "Tropical Diseases of Australia and the Pacific Islands" at the Flinders Naval Depot. This is by arrangement with the Royal Australian Navy.

Obituary.

NORMAN MCLEOD.

We regret to announce the death of Dr. Norman McLeod, which occurred on September 29, 1952, at Prahran, Victoria.

Medical Appointments.

Dr. Cathrena Constance Hammond has been appointed to the School Medical Service in the Department of Public Health, New South Wales.

Dr. R. F. O'Shea has been issued with a licence by the Department of Health and Home Affairs, Brisbane, authorizing him to sign permissions and certificates for cremation, and to grant permission to cremate any human body after death.

Dr. N. J. Chamberlain has been appointed a public vaccinator to the City of Moorabbin, Victoria.

Dr. S. Benedek, Dr. F. J. Scanlan and Dr. E. H. Peterson have been appointed senior medical officers to the Division of Mental Hygiene, New South Wales.

Dr. J. D. Phibbs has been appointed government medical officer at Julia Creek, Queensland.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Lush, Paul Joseph, M.B., B.S., 1952 (Univ. Sydney).
Western Suburbs Hospital, Liverpool Road, Croydon,
New South Wales.

The undermentioned has applied for election as a member of the South Australian Branch of the British Medical Association:

Cooter, Robert Benjamin, M.B., B.S., 1952 (Univ. Adelaide) (qualified 1951), 238 Henley Beach Road, Underdale, South Australia.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association: Pryor, Colin Hutson, M.B., B.S., 1952 (Univ. Adelaide); Mickan, John Herbert, M.B., B.S., 1952 (Univ. Adelaide); Barnes, David Thomas, M.B., B.S., 1951 (Univ. Adelaide).

Diary for the Month.

- Oct. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- Oct. 22.—Victorian Branch, B.M.A.: Council Meeting.
- Oct. 23.—New South Wales Branch, B.M.A.: Clinical Meeting.
- Oct. 24.—Queensland Branch, B.M.A.: Council Meeting.
- Oct. 25.—New South Wales Branch, B.M.A.: Ethics Committee.
- Oct. 26.—Western Australian Branch, B.M.A.: General Meeting.
- Oct. 28.—New South Wales Branch, B.M.A.: Branch Meeting.
- Oct. 30.—South Australian Branch, B.M.A.: Scientific Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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